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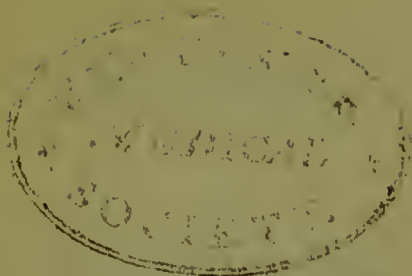
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ON DENTITION.

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W. WILSON, Printer, 57, Skinner-street, London.



ON  
DENTITION,

AND

SOME COINCIDENT DISORDERS.

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BY

JOHN ASHBURNER, M.D.

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LONDON :

LONGMAN, REES, ORME, BROWN, GREEN,  
AND LONGMAN.

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1834.



TO

DANIEL BEALE, Esq.

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MY DEAR SIR,

Gratitude for those rare services which prove a man to be no "fair weather friend,"—admiration of many generous and noble qualities—prompt me to dedicate this little work to you. It cannot go forth to the world under the auspices of a more honourable or a more independent man. I cannot prefix to it the name of a person for whom I could be more proud to pay the homage of public respect, or in private to evince that feeling which assures me that I always remain,

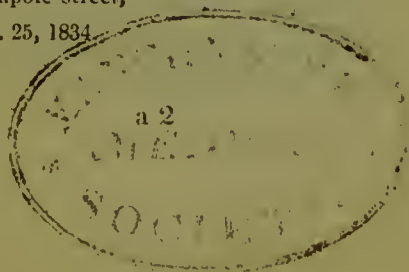
My dear Sir,

Your affectionate and faithful servant,

JOHN ASHBURNER.

5, Wimpole-street,

Jan. 25, 1834



\* \* \* “ Tout est tellement lié et enchaîné dans les corps vivans, qu’une partie quelconque ne peut être troublée dans ses fonctions, sans que les autres ne s’en ressentent aussitôt. Tous les médecins ont connu le *consensus* singulier qui existe entre tous nos organes : il a lieu et dans l’état de santé, et dans celui de maladie, mais principalement dans ce dernier. Combien les maladies seroient faciles à étudier, si elles étoient dépouillées de tout accident sympathique ! Mais qui ne sait que souvent ceux-ci prédominent sur ceux qui tiennent immédiatement à la lésion de l’organe malade ? Qui ne sait que la cause du sommeil, des exhalations, des absorptions, des sécrétions, des vomissemens et dévoiemens, des rétentions d’urine, des convulsions, etc., est souvent bien loin du cerveau, des exhalans, des absorbans, des glandes, de l’estomac, des intestins, de la vessie, des muscles volontaires, etc. ? ”

BICHAT, *Anatomie Générale.*

## PREFACE.

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THE diseases of children, of young women, and of matrons, have for several years occupied a large share of my attention. If in these subjects the differences of age are taken into consideration, we shall find that the ailments of one period of existence throw considerable light upon the analogous states of subsequent periods. Erroneous trains of growth, in persons of more advanced development, are attended by phenomena very similar to those which accompany earlier aberrations. The complications of a higher state of organization lead to inquiries into the differences exhibited by diseases of persons more

advanced. These inquiries have not been neglected. Reflecting upon the influence of growth on health and disease, I could not help being struck by the many varieties which are offered to our observation in the development of the teeth and jaws; and I could not help perceiving the close intimacy which *often* existed between the erroneous conditions of these parts, and the disorders which formed, among children and young women, the principal objects of my studies. Many a year ago, I called the infantile remittent fever a developmental disorder: I saw it very often in all its varieties. I was formerly Physician to the Parochial Infirmary and Workhouse of St. Pancras; to the Westminster General Dispensary; and to the Hospital for the Small-Pox. These institutions gave me for several years immense opportunities for observation. Would that I could say I had always diligently profited by them. Having been previously House-Surgeon to St.

Bartholomew's Hospital, and a pupil at several anatomical schools, I acquired a habit of picking up knowledge, in many instances, through my fingers. Closet thoughts over books are not to be despised, nor ought physicians to condemn the more marrowy science which the anatomical investigator obtains by reflection upon the objects he can handle. Artificial systems of nosology, ingenious, laborious, praiseworthy as they are, have often misled the students of our art. Developmental anatomy, and the deductions from it illustrative of disease, can be reflected upon most advantageously by those who do not despise the use of tools. The conventional ligatures that tie up the hands of the London physician have operated as a great obstacle to improvement. The immortal Harvey was as ready in manipulation as some of our pure surgeons are in taking medical fees. Had he not regarded anatomy as the foundation of his art, we should not now be vying in

expressing our unbounded admiration of his genius.

Developmental anatomy has of late been little cultivated in these countries; and however unaffectedly views founded upon this part of the science may be stated, it is not difficult to perceive that they must meet with opposition, in the form of sneers and ridicule, from persons who either do not or cannot give themselves the trouble to understand a matter before they express opinions upon it.

Having taken up the subject of the ailments dependent upon irritations to the nervous system, from a portion of the dermoid texture of the body growing in trains out of the rule of health, I have attempted in this little work to shew that a disordered course of growth in the teeth and jaws may be attended by very serious or by very slight consequences;—that these vary in *degree*;—and that they may vary according to the susceptibility of the individual, or according to the extent of irregularity



in the course of growth. It is endeavoured to be shewn that if in a child's mouth, or indeed in the mouth of an older person, a due process of absorption does not go on when it ought;—that if a proper growth does not take place as it should do, and consequently that if certain teeth do not appear at their correct epochs, or another set fall out when their proper periods are arrived; and that if others do not take their stations, being obstructed or otherwise diverted from their regular course of growth, *one or more* of certain serious consequences may supervene.

Among such can be enumerated, blindness; squinting; deafness; stammering; St. Vitus's dance; epileptic and cataleptic fits; various forms of nervous and painful disease, commonly thought of as tic and hysterical affections; several diseases of the skin, especially nettle-rash, warts, scalled head, ringworm; some bowel complaints; some fevers; and the disease, which is

an union of most of these, commonly called water in the head.

A man accustomed to a certain kind regard from the more respected portion of his professional brethren, should, I have been warned, have thought well before he ventured to obtrude such views upon their notice. My regret is, that I have suffered years to elapse without engaging minds far more worthy than my own in the investigations I have pursued.

The numerous readers of the *Medical Gazette* need not be apprized that the greater part of this work has already appeared in that journal.

ON  
DENTITION,  
AND  
SOME COINCIDENT DISORDERS.

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*PART I.*

DENTITION is but a part of the course of the development of the body. The whole subject of growth is curious and important, and physiology offers no series of phenomena more remarkable than those which relate to it. The anatomy of the changes undergone during the successive periods of life, by the various organs of the body, and the history of the regular trains of events which establish for each part of the frame its determined epochs of existence, of expansion, and of decay, are sources of interest to all who delight in inquiry. To the practical physician they are of great importance; for the irregularities or deviations from a perfectly healthy standard of structure at

any time of life, ought to be the foundation upon which all his knowledge is built. The irregularities in the course of dentition possess an importance that has not yet been sufficiently estimated.

It is well known that no part of the frame assumes at once the degree of perfection necessary for the complete performance of the functions to which it is destined. In order that the unfolding which accompanies growth—the evolution which is known by the term development—may be complete, a certain time is required; and as the whole frame is composed of many parts having among themselves mutual relations, the periods of their progress are characterized by events that are marked by the importance of the part to which they have reference. Each portion of the organism seems to be developed in its own turn, and its epochs of commencing existence, of improvement, and of decay, as well as its weight of influence on other parts, appear to have some relation to its importance in either the general government or the preservation of the being. Perhaps there is no law of growth better established than that which assigns to each organ, and to the entire organization, certain periods of

progress, that in a *normal* and regular order obey a determined course (*loi de developpement*; Meckel, Manuel d'Anatomic, traduit par Jourdan et Breschet, tom. i. p. 43.) During each of these periods there is the acquisition of a higher state of perfection up to a certain time of life.

If there exist any circumstances determining an irregularity in the occurrence of these periods, the *normal* order is subverted; the *rule* which obtains in the majority of instances where a healthy and convenient configuration of the body is present, must be broken, and the epoch, arrive when it may, is *anormal*. Nothing exists in nature that is not the subject of a law; and in animated nature, whenever circumstances intervene to obstruct the due course of a law, an irregularity is established which is the immediate source of an inconvenience. In the whole body, in every part of the body, in a condition of *perfect health*, there is a determined configuration, which is *normal*; a configuration the most convenient for the proper performance of the functions to which the body or the part is destined; a configuration, considering the large majority of the race, recurring more

often than any other, and consequently regarded as the standard rule of regular structure. If there be an aberration in any instance from this convenient arrangement, the formation is said to be *anormal*. Normal development, then, relates as well to the perfection of form as to the regularity of epoch in the course of growth. There is a law established by Geoffroy St. Hilaire, that the development of one organ in excess is always at the expense of another. (*Philosophie Anatomique des Monstr. Humaines*, tom. ii. Discourse Prelim. p. xxxiii. et p. 244.) In the growth of organs, and in their relative development, much depends upon the alliances they have with each other. The intimacy of connexion in the performance of functions that one organ has with another, is not so easy to establish as might be imagined; but observation leads to the conclusion\* that imperfections of parts, either from a diminished share of development, or on the other hand from excessive growth, tend always to irregulate the functions of other parts associated in duties with them. The French authors, in distinguishing these aberrations from normal configuration, where the case arises merely

from an excess or a diminution of growth, give to them the appellation of *vitiations*: they say a part is vitiated by excess or by diminution. A woman who has a pelvis well-formed in other respects, but too small for the proportion of her body, is said to have this part vitiated by excess of littleness (*vicié par excès de petitesse*. Maygrier, Des Accouchemens). The health of the individual, however, in such a case, is said to be perfect, since a diminutive pelvis does not interfere with the due performance of the ordinary functions of the body. If our distinctions between normal and anormal conditions of configuration be philosophical, they should be severely established. There can be nothing more loose in the application of terms than to denominate that condition one of health, in which an anormal configuration exists that may, under probable circumstances, cause the severe suffering of the individual, and perhaps her death. *Complete health* ensures a regular progress and perfection of each part of the system; a harmonious combination and alliance of all the different organs, for the general convenience of the whole; the best performance of all the functions in their

regular trains; the happy development of each part in its due order, without pain or the presence of any other evil: a course of events always flowing where normal trains are quite established.

But if the trains of growth be irregular, or anormal, there may be a question as to the parts first affected by the irregularity, and as to the importance and alliances of such parts. An error of a part necessarily involves an inconvenience—an undue performance of a function. If the organ be influential in its alliances, the error may produce immediate suffering, and even be the antecedent of death.

In man, endowed as he is with a proportionate large share of brain, the influence of circumstances operating through the nervous system may tend very materially to anormalize the trains of growth, and to irregulate the periods of organic development. The artificial habits to which he appears, under the present arrangements of society, to be destined, are constantly productive of injury to the frame; and though no animal appears to have so elastic a power of adaptation to nocent circumstances, he cannot altogether escape their force.

These observations are no where



more strikingly illustrated than in the phenomena which occur during the progress of dentition; a train of development that presents epochs in life often irregular, in civilized communities always more or less stormy, and that, from the intimate alliances which subsist between the brain and nutrient organs, entails consequences of great importance.

The changes which the teeth undergo in the progress of their growth form a very curious and a very interesting subject of inquiry. There are, perhaps, no occurrences relating to the changes of the body during life, more striking than the manner in which all the rudiments of the teeth are disposed in the jaws. The structure of these rudiments is so curious—the mode of their alteration, their evolution not hasty, but at distinct and marked periods—their symmetrical consent in arranging themselves in pairs round the circumference of the alveolar arch—their relations to this arch, and the consent which obtains between the development of this part of the body and the growth of the teeth themselves—the changes of maturity, and decay in the first set, and their replacement by another—are all subjects for deep reflection.

Regarding them simply, then, as isolated portions of the general organism, the history of their development is full of remarkable phenomena; but looking to their sympathies as organs of a curiously complicated structure in alliance with the brain, nearly related to the other organs concerned in nutrition, and furnished with nerves that are linked with the great sympathetic, the varied influences they possess afford a most extensive subject for observation. We may ask, what are the most essential circumstances attendant upon a normal development of the teeth? and what are the causes tending to anormalize it?

The bones are regarded as the solid framework upon which all the rest of the body is built, and although we know that ossification commences at an epoch posterior to the existence of some other organs, and although we are aware that a moulding of bone is thrown over some other important part of structure which has previously existed, we are no less right in giving its due share of importance to the osseous fabric. In all parts of the body where the bony development does not proceed in a normal train, there is surely some error of structure in its vicinity. The functions of the part to which the bone serves as a standard or

defence, cannot be performed in a manner consistent with *perfect health*. Disease of any kind in a bone entails mischief to the functions of the muscles in its neighbourhood, or with which it may be connected; nor is this the only inconvenience that may result. The whole body depends for its health on the existence of a due harmony between all its parts, and the moment when that harmony becomes disturbed, there is a discordance established, which more or less extensively affects the health of the system. The alliance between bones and muscles is very intimate, and the healthy growth of each depends upon the due performance of the functions of the other. The shape of a bone cannot be quite normal, if the muscles that are in connexion with it do not rightly and according to rule perform their duty; nor, on the other hand, can a muscle be in a perfect state of structure and health, if the figure of the bone to which it is attached be in any way imperfect. The habits of society are in many respects so irrational, that the measures conducive to the healthy performance of the various functions of our bodies seldom enter into our thoughts, and the influence of education in the healthy moulding of our frames,

though occasionally considered, is not applied in a philosophic manner to produce the results which might emanate from a wise direction being given to the events of a course of life. We may see a highly-educated musician fingering with curiously graceful facility the keys of a pianoforte, without reflecting on the inevitable improvement that must take place in the development of the bones, the tendons, and muscles of the hand and arm. We may reflect on the means which render the chest and the arms vigorous and well developed in the frame of a boxer or of a rowing boatman; but the facts, although striking, are not applied with any philosophic care in our schemes of education, to the training of the human form, in order to promote a healthy development of its organs,—a growth unattended by pain, inconvenience, or sympathetic evil.

We think little of the direction which may be given by art to the trains of growth, so as to determine the perfection of the most beautiful as well as most healthy form of which it was intended that the organs of the body should be susceptible. The vile taste and unnatural fancies that prevail on the subject of dress, are quite sufficient to bear out

the justness of this observation; and it is very curious to remark, how far the influence of these circumstances reach, in not only disfiguring the external aspect of the trunk, but in promoting, under various conditions, aberrations from normal shapes and strutures in parts little considered by the mass of mankind to be under their pressure.

It is quite true that the whole fabrie is formed of parts so curiously allied one to the other, that the irregulation of one important organ drags after it other parts, which share in the mischief it has suffered. Hence we find that in frames not vigorous enough to withstand the effects of badly-applied dress, the bones become turned out of their normal relations to each other: the muscles allied to them are altered in their symmetry, size, shape, and direction: that other important organs suffer errors to be established in them in a manner that has been little noted as influenced by such causes.

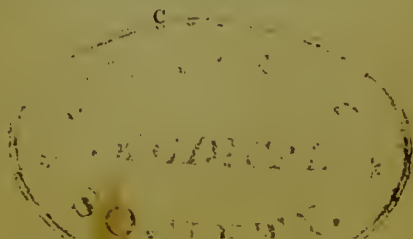
If an individual with a curved spine be observed, in whom any remarkable gibbous state is present, we cannot fail to notice the effects entailed on the countenance, and the consequent expression which is given to the features;

but we observe this consequence very seldom, if the curvature has not dragged the face after it in a very striking manner. Nevertheless, the consequence does follow the antecedent circumstance, and its degree may have been sufficient only to diminish the size of the jaws; to render them too small for the space which nature requires as the normal dimension for the proper development of the teeth.

It is very reasonable to believe that, if there be not sufficient space in that part of the bony fabric in which the teeth are placed for their full growth and proper position, they cannot be normally developed. The most essential circumstance, then, attendant upon a normal development of the teeth is a normal and consentaneous growth of the jaws.

We have already regarded some of the circumstances which may tend to anormalize the growth of the jaws. But there are others which may be considered at a future period, and in a more advanced condition of civilization, when the folly of many of the passions in which we now indulge, and the ignorance of the habits to which in the present state of society we liberate ourselves, shall be fully understood and al-

lowed, as the causes operating to produce not only deviations from normal structure and consequent misery to individuals, but a tendency in numbers to form diseases that may reverberate upon the community. There may be habits among individuals, or among classes, that may have the influence of making the nisus of development more energetic in one part, and more sluggish in another. The frame being habitually submitted to the modelling which certain trades and occupations force upon it, is apt to lapse into a diseased condition, altering the relative normal influence exerted by one part upon another. The inevitable necessity of living in a large town has so powerful an effect upon the nervous systems of some persons, as to be destructive of the balance that ought to exist among the organs in a healthy state. These and many other circumstances may be found to operate either immediately, or through intervening events, upon the growth of the jaws. Rickets appear in individuals, and if the disease arrives at a time of life when the teeth are not fully developed, it may tend very materially to anormalize the relative trains of growth. May not a *vitiation* of the jaws result from the



mind being accustomed to certain habitual trains of thought, or from bad habits that induce those trains, which give an expression to the countenance, determining the configuration of the face? An anormal state of the jaws may be the consequence of disease superinduced by the ill-advised practices of ignorant parents.

Dr. John Clarke, in his Commentaries on the Diseases of Children, p. 46, says, "It cannot reasonably be maintained that a child's mouth without teeth, and that of an adult furnished with the teeth of carnivorous and granivorous animals, are designed by the Creator for the same sort of food;" and yet, notwithstanding the clear injunctions enforced by this talented physician, the practice of feeding infants with materials unfit for their tender stomachs, obtains very commonly in quarters where it ought long ago to have ceased. There is no reckoning upon the amount of influence which improper food taken into the stomach at the tender age of infancy, may have upon the progress of growth in the jaws. Improper food itself commits an injury upon several parts of the alimentary canal, which may recoil upon the structure of the jaw. In very young infants



of a highly irritable and mobile condition of nervous system, if any other food than human milk be given, there is in many cases an immediate diarrhœa, with rapid atrophy, and an aspect of countenance which must tend to alter the healthy modelling of the jaws. There is an effect of indigestion that may be called the sensation of physical grief: it is felt at the back of the fauces and along the throat, and resembles the sensation which those know who have suffered from mental grief. Its tendency is to depress the countenance, and consequently in a certain degree to interfere with the progress of development about the face. Perfect health requires a certain joyous expression, and the absence of all evil trains of thought. In childhood, especially, should complete happiness prevail. It is hardly necessary to point out the incompatibility of habitual indigestion and cheerfulness.

But there are other requisites to a normal development of the jaw which improper feeding denies to the infant. The normal consent between the muscles of the jaw and the muscular structure of the stomach, is unhinged—the balance is destroyed, and the stomach has to perform a share of duty never in-

tended for it. In the carnivorous animals, the museular apparatus of the stomach has a development bearing an inverse proportion to the muscles of the jaws, (Biehat, Anat. Descrip. t. ii. p. 40); and certainly in man the ratio does not approximate to the type of the ostrich. The lower jaw is so articulated with the upper that it is capable of various motions, when acted upon by any of its five pairs of muscles. In the act of sucking, each of these muscles performs a share of duty, and the correct progress of growth in each muscle depends in some measure upon the shape of the body submitted to the mouth, and the consequent practice and direction of the forces exerted upon that body: hence the course of practice of the jaws, the mouth, the tongue, and their muscles, cannot be the same, if exerted upon spoon meat, as upon a nipple of a woman's breast. Nor is this all. The muscles attached to the jaws are associated with other organs in the train of their duties. The bloodvessels, absorbents, and nerves, the salivary glands, and the follicles of the mouth, are dependent for their healthy action upon the normality of neighbouring parts: the influence of the whole set of organs is neces-

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sary for the existence of a harmonious consent, without which development is irregular. Growth to be correct in the jaw implies the requisite performance of all the functions of the organs in its neighbourhood. If any organ be in fault—if its functions be arrested, its growth, too, is retarded; nay, in some cases, it dwindles: at its expense, some other organ is developed in an undue proportion; perhaps the muscular structure of the stomach may be the part that acquires a morbid growth, and consequently obtains a morbidly disordered function that recoups upon the development of the jaws.

A question to which, in the present state of our knowledge, it would be very difficult to reply, is, How far may irregular formation, induced by the unphilosophical artifices of society, be reverberated in the structure of offspring? Each child, of a train born at successive periods of the parents' life, retaining the resemblance of the organization peculiar to the parents at the time it was called into existence, may under this idea have laws impressed upon its fabric, which shall determine it to assume all the errors or abnormal peculiarities acquired by the faulty habits of the parents. With-

out some admission to this effect, we find it difficult to understand how, in certain families, through successive generations, there is a prevalence of narrowness about the chest—a tendency to curvature of the spine—a proneness to a diminution about the pelvis—the existence of jaws too small for the teeth. When the philosophical anatomists have unfolded to us a few more views, it may be that we shall be enabled to trace with greater accuracy the sources of deviation from normal form in families. Meantime, enough is established to allow a conviction that there are certain laws governing even the deviations from usual and convenient structure, and where these laws have begun to operate before birth in fixing a tendency to the vitiation of the jaws, we have at present only left to us to watch the facts connected with them. If the type of configuration in a family be anormalized, we know little about the causes; we are not yet sufficiently advanced in knowledge to be able to trace all the sources of congenital malformations.

We turn now to the teeth. The rudiments or germs of the teeth appear at a very early part of life. Serres says (*Anat. et Phys. des Dents*, 1817, p. 2.).

that nature works at their formation almost immediately after conception. The embryo has hardly begun to be distinct, when the head and all the organs which it contains are sketched out. The teeth, destined to fulfil the first function in the circle of life, form and grow in the interior of the jaws. This philosophical anatomist asserts that the jaws of the fœtus contain, although in a very limited space, the rudiments of all the teeth with which the adult is to be supplied. (See likewise Rousseau, *Anat. Comp. du Syst. Dentaire*, p. 46.)

In an embryo of two months, he met with the rudiments of the incisors and molares of the first dentition, in the form of rounded bodies not larger than pins' heads (*Mem. de la Soc. Med. d'Emul.* tom. viii. p. 134.) In one of two months and a half were found the canines, and at three months the germs of all the teeth of the second dentition—even the *dentes sapientiæ* were in existence. These germs are found imbedded in the membranous folds, which at this period constitute the gums. Those of the first dentition are attached immediately to this membranous fold; those of the second are suspended from it by means of a small pedicle. Meckel (*Manuel*

d'Anat. t. iii. p. 341), in each half of the two jaws of a fœtus of the tenth week, saw distinctly the capsules of four teeth: two anterior, smaller; two posterior, more bulky, which were dovetailed together two and two; but the anterior and posterior separated by a space. At the end of the third month a third bag was found between the two pairs, so that the whole number of capsules observed was twenty. He says, commonly about the end of the fourth month a sixth capsule, placed altogether behind, is found, and this is destined for the anterior of the permanent molares.

Serres met with fibrous partitions separating the incisors at four months, but all the other germs were contiguous to one another. At six months, ossification of the partition of the lesser molaris was found, while the germs of the two posterior molares were still lodged in one cavity.

At first these germs are little membranous capsules, containing a reddish fluid; the contents gradually become a whitish yellow liquor. Before the fœtus has existed four months in the uterus, and in some cases three months, a small, reddish, and soft body, rises from the bottom of the internal lining of the

bag. It gradually assumes a consistence, and becomes the pulp of the tooth. This little substance is abundantly supplied with nerves, and is nourished by blood-vessels ramifying through it. Gradually it acquires the shape of the tooth, and is the nucleus around which the tooth is moulded. The crown of the tooth is the first part formed, and is in existence some time before the remainder appears. But the bag in which the pulp first appears, and from which it receives its blood, has a conformation well worthy of attention.

This bag, sac, germ, or capsule, has been sometimes called dental matrix. (Rousseau, *ante cit.* p. 50.) John Hunter (Nat. Hist. of the Teeth, p. 87) says, "We find it made up of two lamellæ—an external and an internal. The external is soft and spongy, without any vessels; the other is much firmer, and extremely vascular." Blake (Essay on the Structure and Formation of the Teeth, &c. Dublin, 1801, p. 4) describes these sacs "or membranes to be thickest and most dense next the gum;" but as becoming "by degrees softer and more gelatinous towards the lower part. They can be easily separated into two lamellæ, the external of which

is spongy and full of vessels; the internal one is more tender and delicate, and seems to contain no vessels capable of conveying red blood." Hunter and Blake are upon this point at variance. Fox (*Nat. Hist. and Dis. of Teeth*, p. 20) states that, both in the human subject and in the calf, he has "found both the lamellæ to be very vascular;" and in this assertion he is confirmed by Meckel, who has observed the fact in the human embryo and in that of animals, and who adds the remark, that the external membrane has the largest supply of blood (*Manuel d'Anat.* tom. iii. p. 341.) Bichat was at some pains to determine the nature of these membranes; and he conjoins them, asserting their analogy with serous membranes (*Anat. Génér.* tom. iii. p. 91); but Serres has corrected his view of the anatomy, and declares (*Essai*, &c. p. 12) that the external and internal membranes are distinct from each other, not only by their distribution, but by structure and function. According to him the external layer is fibrous, opaque, and whitish; on one side attached to the alveolus, to which it serves as periosteum; on the other, applied to the external surface of the internal membrane. Adhering firmly by its interior part to



the dental vessels and nerves, it is at the same time united to the cartilage of the gums. John Hunter had observed the existence "of a mucilaginous fluid, like the synovia in the joints, between the internal membrane and the pulp of the tooth." Meckel (t. iii. p. 340) places it between the membranes, and states that the distance which separates these is greater as the foetus is younger. Serres remarks, that the external membrane has a decided elasticity, and compresses the fluid, which with Hunter he places within the inner membrane. (Essai, p. 13.) The external is, according to Meckel, more spongy, lax, and soft, and more thick than the internal membrane, which Serres declares to be very thin, transparent, and of a nature *sui generis*. Both agree that it forms a bag, distinct from the external layer and from the gum. It is the formative organ of the enamel, and its relations with the tooth are consequently more intimate than those of the external membrane. It is very abundantly furnished with blood-vessels, as may be demonstrated by a successful injection.

Let us ask, how are the capsules retained normally in their positions?

There must be some law which regulates the positions of the little membra-

nous germs or capsules in the earlier periods of their appearance in the embryo, or they would be thrown together by chance medley, and would become confounded as to their arrangement in their places in the arched line of the jaws. At first, the capsules are lodged in the membranous folds which constitute the gums; those of the first dentition are immediately attached to them; those of the second are suspended from them by a pedicle. The capsules of the first dentition, connected together, lie at the lower part of the gums, and form a continuous chain, which can with ease be detached from the jaw. The capsules of the teeth of the second dentition are nearer to the surface, and approximate the gums more than the others. When the foetus has been four months in the womb, there are fibrous bands or partitions found between the capsules of the incisor teeth, but the sacs of all the others lie closely attached to each other. At five months, the partitions between the incisors have become bony; the sockets of the molar teeth have become partly ossified. At eight months, the relations of these rudiments remain as before, though their development is advanced. Nine months of gestation pass.

The child is born ; but though this be a period of important change, so as to form a decided epoch in the history of some other organs, our inquiry as to the normal progress of development in the teeth is not much affected by it. The progress of growth of the teeth follows a law which is not materially influenced in its course by the event of birth. Normally, no teeth have passed through the gums. Dissection shews us the positions of the capsules at this period. For the completion of the first dentition, each jaw has four incisor teeth, two canine, and on each side two molar teeth ; their capsules are found to be thus placed in the arch : in the lower jaw the incisors lie obliquely from without inwards ; almost contiguous to those of the lateral incisors lie the capsules of the molar teeth, the second behind, and a little lower than the first ; so that, looking at the jaw from within, it is perceived that the superior margins of these capsules describe an arc. In this aspect the canine capsules are not seen ; they lie externally, and jut out a little before the mental holes. The upper jaw is somewhat differently situated as to its dental capsules. Those of the incisors are less oblique ; and those of the molar do not,

in union with them, describe the same curve as the capsules of the lower jaw. The canine appear to be external.

It has been remarked, that the capsules of the second dentition are nearer to the gums than those of the first; gradually they change their situation, become more distant, and are at last imbedded in the interior of the jaws.

The development of the tooth proceeds in the capsule; the crown being the first part formed, all the depressions and eminences which ought to exist on it can be perceived, while no other part of the tooth is yet formed.

It would be very difficult to fix with precision the epoch at which ossification, as it is called, of the teeth commences. Meckel states, that it commences about the middle of the term of pregnancy (tom. iii. p. 342); while the researches of Serres tend to fix it between the third and fourth month. He justly observes (Essai, pp. 57, 58) that diseases may retard the progress of development; and causes which we cannot appreciate may, in certain individuals, advance it. Its normal epoch, then, is not fixed.

The ossification is as much a step in the progress of growth as the cutting of the tooth, and is in all probability sub-

jected to the influences of the same course of laws as those which determine the period of that epoch ; and hence the teeth in which ossification has first commenced are those which first present themselves through the gums : thus the inferior central incisors have the first ossific points ; then the lateral incisors ; thirdly, the anterior molares ; and after them the canine.

As to the mode in which the ossification proceeds, the train is this : on the external surface of the pulp, and first on the juttings representing the tubercles of the tooth, an appearance of slender, elastic, delicate little scales, takes place ; these are soft, but gradually become thicker and more dense ; they are hollow, and very slightly elevated. By degrees an union takes place between them, and at the same time the osseous substance thickens at its first points of existence, at the juttings representing the grinding tubercles ; the crown of the tooth gradually enlarges, and at last acquires its full development. Its lower portion, narrowing in all directions, is called the neck of the tooth, and the roots are evidently elongations of the crown : but does the same progress of ossification obtain in the formation of

them? Very accurate anatomists are here at issue. Meckel, adopting the views of the English anatomists, asserts that the pulp proceeds absolutely in the same manner in the formation of these as of the crown; while Serres maintains (Essai, p. 65) that the mechanism of their development offers very essential differences. His view is, that the crown is formed at periods distinct from the development of the roots. In the single teeth, a single point of ossification exterior to the pulp indicates the commencing formation of the crown. (Fox, p. 22, states that there are three points; while Blake, p. 6, and Bell, p. 55, say one.) In the double teeth the number of points corresponds with the number of tubercles. When the crown is complete, the tooth is narrowed between it and the root; a line of demarcation exists. Here is the neck, and here the margin of the membrane adheres so firmly that it cannot be separated from the tooth without lacerating several vessels which pass between them into the tooth. Blake (p. 16) found "the membrane much thinner at this part; and I could not," he says, "separate it at any period into two lamellæ." Serres asserts that in the root there is a change of

nature and of colour. So far of the teeth with single roots; but in those which have several, when the ossification has proceeded as far as the neck, it is at the exterior suspended: the interior, still concave, begins to be developed; the pulp sinks, and its bulk is reduced; but before it comes to the level of the external ossified part, the roots have already begun to be developed. One, two, three, or four bony tubercles, forming its external layer, are already present; then from the inferior part of the pulp an equal number of osseous laminae proceed. This account varies very materially from the view given by Fox, who tells us that "the ossific matter is deposited in strata, one withinside the other." "When the body of the tooth is formed, the pulp elongates, and takes that form of the jaw proper to each tooth, and bone is deposited upon it; it then becomes gradually smaller, until it terminates in a point. If a tooth have two or more fangs, the pulp divides, and the ossification proceeds accordingly." Bell adopts the notion of Fox, which is in fact an abstract of the labours of Blake, who was at some pains to make out the physiology of this development. It must be confessed, however, that the

matter is not set at rest. The ingenious explanation of Serres, proceeding upon the existence of a structure of blood-vessels, divided into bundles, penetrating the inferior part of the dental germ destined to the formation of the roots, deserves deep attention in the future investigation of this subject.

The ossific deposit, then, is from without inwards; so that the first tubercles appearing are the parts which remain exposed. The grinding surface and the first shell of the tooth are now the full size which they preserve when the tooth is formed. There is an ample cavity within the shell, a proof that the outer surface of the pulp forms the osseous part of the tooth. As the osseous matter thickens, the pulp and dental cavity diminish; the outer layer being most extensive, advances most slowly; and the inner layers, shorter, are more quickly deposited, making the cavity of a grinder recede with greater rapidity than any other from its upper surface. "After the roots commence, the cavity is soon diminished, the ossification going on at the same time at both the upper and under parts of it. As many conical or flattened tubes are left leading to the cavity as there are roots; and as many



hollows or depressions in the superior part of the cavity as there are protuberances on the grinding surface. The pulp, though very much diminished, still retains nearly its original shape." (Blake, p. 13.)

English anatomists have appeared anxious to retain an analogy between the osseous substance of the tooth and common bone. Meckel admits the analogy as far as chemical constitution and physical properties allow him to coincide, but perceives a striking difference in the mode of their union, development, and peculiarities of vital phenomena. In all these, he feels they are more analogous to epidermic formations. We call the basis of the tooth wrongly. It is not bone, and we ought not to speak of ossification. It is harder than bone, and its tissue is not cellular: it is far more solid and compact than bone. Meckel speaks of it as ivory. How Bichat could have detected fibres in this structure, it is difficult to conceive; it is, in fact, composed of layers situated one upon another. Volcher Coiter was the first to observe that the dental substance was formed without any intermediary cartilaginous basis. The whole train of development of the teeth is perfectly

dissimilar to the manner in which bone forms and grows. As in a state of health the tissue of tooth ivory is so different from the fabric of bone, so the diseases which affect the two textures have no analogy between them. The spontaneous decomposition of bone after death is found to be much more rapid than that of ivory. In the earth, bones are often found mouldered, while the teeth of the subject have been comparatively little affected. The mineral acids dissolve the earthy salts of bone with rapidity. Several hours' immersion of a tooth in the same liquids hardly affects the ivory, or at most slowly render its lamellated structure more apparent. The chemical composition of bone and of tooth ivory, too, offer very striking differences. Bone, according to Berzelius, (Ure's Dictionary of Chemistry,) in 100 parts, contains of

|                       |   |   |   |       |
|-----------------------|---|---|---|-------|
| Phosphate of lime     | - | - | - | 81·9  |
| Fluate of lime        | - | - | - | 3     |
| Lime                  | - | - | - | 10    |
| Phosphate of magnesia | - | - | - | 1·1   |
| Soda                  | - | - | - | 2     |
| Carbonic acid         | - | - | - | 2     |
|                       |   |   |   | <hr/> |
|                       |   |   |   | 100   |

Ivory, according to the same autho-

rity, (Bell on the Teeth, p. 7,) in 100 parts, contains of

|                                                                     |   |   |   |       |
|---------------------------------------------------------------------|---|---|---|-------|
| Phosphate of lime                                                   | - | - | - | 62    |
| Fluate of lime                                                      | - | - | - | 2     |
| Carbonate of lime                                                   | - | - | - | 5.5   |
| Phosphate of magnesia                                               | - | - | - | 1     |
| Soda, and muriate of soda, with a quantity of hydrochlorate of lime |   |   |   |       |
| inappreciable                                                       | - | - | - | 1.5   |
| Gelatine and water                                                  | - | - | - | 28    |
|                                                                     |   |   |   | <hr/> |
|                                                                     |   |   |   | 100   |

The sagacity of my friend, Dr. Prout, had led him, at too early a period of his studies in physiology for him to know the views of continental authors, to collect the arguments in the affirmative of the proposition, that the teeth have a stronger analogy with the epidermic formations than with bone. The same views were entertained by Mayer, Kaathoven, Bonn, Walther, and Lavagna, and since ably condensed by Heusinger. (See Meckel, Man. d'Anat. tom. iii. p. 357, note des traducteurs, Jourdan et Breschet.) The points are these:—1. In the mammalia, there are insensible transitions, among the teeth, from those which seem most to resemble bone to the different parts of the bony system—nails, hoofs, and hair. 2. The

teeth of several of the mammalia have a lamellated structure similar to nails and horn; and this structure, though it may be rendered evident in all the teeth, appears to be lost in some, merely on account of the accumulation of a large proportion of earthy salts in their composition. 3. The mode of development of the teeth resembles that of nails and horn. 4. Certain teeth are reproduced like nails and horn.

Geoffroy St. Hilaire, in adopting the conclusions upon this subject of Coiter, in his *Spicilegium Anatomicum*; of Herissant, in the *Memoires de l'Academie des Sciences*; of the great Cuvier, in his *Animaux Fossiles*, art. Elephant; and of Serres, in his *Nouvelle Theorie de la Dentition*, speaks of the tooth as a mass composed of layers, in which, except a first cartilaginous stuff, there is nothing which can be compared to the osseous tissue, (*Système Dentaire des Mammifères et des Oiseaux*, p. 23); but Geoffroy St. Hilaire takes a high range in the philosophy of this subject, when, by demonstrating the analogy which exists between the dental system of the mammiferous tribes and the beaks of birds, he carries on the approximation of these organic arrangements to the

epidermic formations; and proceeds to shew, that though the teeth and their analogous parts about the head, may be, at a later period of life, destined to important functions in the general process of nutrition, yet that, when the dental formations appear in the fœtus, they are truly fœtal organs, useful and destined to give a mode of termination to the circulating system of the advanced parts of the head, in fixing a limit to a certain number of vascular trunks,—an idea the more important as regarded in relation to the fifty-two germs of teeth existing at an early period of intra-uterine life.

Let us now examine the substance which is found in the interior of the tooth. Each root or fang has a hole at its extremity, for the passage of nerves and bloodvessels, which are distributed to the pulp—a soft substance that occupies the cavity of the tooth, without having any connexion with its parietes. A slight exhalation is found upon its surface. The characters of this substance, according to Serres, resemble those of the nervous ganglia of nutritive life, (Serres, p. 51.) It appears to possess the same kind of sensibility. This organ exercises a very important influence upon the tooth, and plays a part in

relation to the general system, not yet well appreciated. The nerve which forms the pulpy part of the internal cavity of the tooth, has appeared to Serres (Essai, p. 52,) to approach, in its structure, the vidian nerve, the communicating branch of the great sympathetic. In the incisor and canine teeth, the nerve and vessels which penetrate the root, having arrived at the neck, swell out. A single tubercle is formed by this swelling, the pulpy part of which is said to be nervous matter: upon this the small vessels ramify. They are much more numerous in youth than in age. In the former, the pulp is red; in the latter, it is a decided yellow. In the larger molar teeth, each nervous branch expands in the dental cavity, and abuts against its neighbour, so that the pulp appears to be formed of as many parts as the tooth has tubercles. The base of each tubercle has a cavity in it, which receives the summit of the pulpy tubercle that belongs to it. Serres says, that in penetrating the dental cavity, the nerve seems to change its characters: it *softens*, changes in *colour* and *organization*, and forms a pulpy nucleus, which he regards as a true ganglion, not unlike the submaxillary

ganglion formed by the chorda tympani. (Essai, p. 53.) I have examined the dental pulp with some care, but I do not feel warranted in affirming the notion of Serres, opposed as his view is to all analogy. This point of organization yet requires investigation. My friend, Professor Macartney, of the University of Dublin, has been in the habit of classing the teeth among the dermoid structures, and he compares the dental pulp to the pulp of a quill. From the views which he entertains on the anatomy of the skin, and of the mode in which nerves terminate in the dermoid formations, he would be disposed to deny that nerve has been traced into the texture of pulps, as a constituent of such organisms. According to this acute observer, the villus of skin is composed of cellular substance, blood-vessel, and invisible expansion of nerve, and wherever a nerve may have been traced to its insertion in the commencement of the pulpy substance of a dermoid part, as in the whisker of a seal or the great quill of a swan, it has, according to him, eluded all further search after it in the interior of the substance itself. Nerve, then, though it exist in such parts, is not, by our present forms

of manipulation, to be traced. It is no longer a bundle of fibres, but becomes altered in its arrangements: it is functional extremity of nerve, and like the nervous part of the retina, is expanded, and quite invisible. Under this idea, the dental pulp is cellular membrane having blood-vessels, and the functional extremity of nerves associated in its structure.

The course of growth of the enamel remains to be examined. Not long after the development of the ivory scales, or even while they are forming, the secretion of enamel begins. The internal membrane of the capsule loosely surrounds (Blake, p. 16) the crown of the tooth. Meekel says (tom. iii. p. 344), that it envelops it so as to mould itself perfectly upon its juttings and depressions. From the internal surface of it exhales a fluid, the duty of which is to place on the ivory of the crown a crystalline substance, at first so soft that in the full-grown foetus it is easily separable from its ivory basis. As the growth of the ivory proceeds, this substance increases in thickness. It is of a pale white while it remains in the interior of the membrane, and does not acquire a polish until it has been exposed to the



air. This is the cortex striatus of Blake, —the enamel. It does not extend to the roots of the teeth.

The enamel may be seen on a broken tooth, composed of innumerable fibres, "attached," says de la Hire, "to the internal part of the tooth by their roots, nearly as the nails and horns are to the parts with which they are connected;" (Blake, p. 125; and De la Hire, *Mém. de l'Acad. Roy. des Sciences*. 1699) but not so intimately, however, as to form more than an adhesion to the surface of the ivory. Concentrated nitric acid quickly dissolves it, and leaves the surface of the ivory smooth. The enamel is thinner on the milk teeth than on those of the adult set. It is thicker on the canine teeth than on the incisors, and is deposited in larger share on the large molar teeth; perhaps because these are destined to support the chief wear of mastication.

The membrane which secretes the enamel invests the crown of the tooth, and adheres firmly to its neck. As ossification advances the crown of the tooth rises, and the membrane of course accompanies it. On the tubercles and cutting edges of the teeth the crystallization of the enamel is first completed, and the process continues until the neck

is reached: the membrane covering it becoming gradually thinner and less vascular, is at last quite absorbed. The absorptive process goes on in the gum covering the tooth, which at last presses through, and is said to have cut the gum.

What is the period of life at which the first teeth are cut?

To establish this epoch so surely and correctly as that any deviation from it would be anormal, would be a very difficult matter. The works of anatomists and other writers may be consulted, and the time which they state will be found to vary. From the sixth to the eighth month of life is the vague definition given of the normal period of the first eruption of the teeth through the gums. (See Baumés, *Prem. Dentit.* p. 21.) Rarely earlier, often later it may happen. We have no means, as society is at present constituted, of arriving nearer to the truth. The modifying circumstances that surround us in every direction, tend so powerfully to irregularate the periods of organic development, that a variation is found to take place in the course of even those events which appear to be most completely under the influence of fixed laws. The period of gestation has been found to offer anomalies. The standard period has cer-

tainly not been minutely established, enough having been discovered to make us aware that varieties are often presented to our notice quite incompatible with the idea that the law has no exceptions. The development of the teeth offers, in respect to its periods, considerable irregularities, and the aberrations from the normal period are perhaps at no epoch more frequent than at that of the first cutting of the first set. The trains of growth have gone on so rapidly in respect to a few of the first teeth, that examples of children being born with two, three, or four, teeth cut, are not uncommon. Haller quotes nineteen cases of precocious appearance of the first teeth, and instances in other authors are not rare. (See Baumes, p. 20.) Few practitioners of extensive experience can be without some such cases.

No events exhibit the influence of modifying circumstances in the early history of development more strikingly than the accelerated growths of particular organs, and the disordered conditions of others, produced upon the infant by the habit of the nurse's system. I once saw a case of precocious appearance of two incisor teeth of the lower jaw, in a female child of three months

old, which was nursed on the breast of a fine stout Irish woman, who had herself had two children cutting teeth at the same age, both of which had died from the rapid progress of dentition. The suckling was a delicate infant, and had a bowel complaint, which induced the parents to change the wet-nurse; and the child thrived, and had no other teeth for five months afterwards.

In other cases the development is very tardy. I have seen a child twenty-two months old beginning to cut its first tooth, which was an incisor, in the upper jaw: it was a very delicate, though lively infant, with large head, tumid abdomen, and peculiarly small-sized extremities. Van Swieten relates a case of a very healthy female infant, which did not cut a tooth till it was nineteen months old. Serres quotes cases of persons cutting their first teeth, from Raymond, Fauchard, Brouset, &c. who had passed through several years of life. (Essai, &c. p. 75; also Baumés, p. 22.)

“ Parmi les observations de Lanzoni,” says Serres, “ on en trouve une forte interessante, dont le sujet fut le fils d’un apothicaire. Ses premières dents ne pousserent qu’à l’âge de sept ans, et il ne commença à parler qu’à cette époque.”

I had, long before the Essay of Serres fell into my hands, observed so many cases of tardy access of speech, and of stammering, connected with erroneous development of the teeth, that I had noted the concomitance, for the future treatment of the fault.

The teeth of the first dentition commonly cut in couples; a short interval of time occurring between the appearance of each tooth, connected perhaps with the preponderant energy that obtains on one side of the body. The two anterior incisors of the lower jaw should appear first; then, after a shorter or longer period, perhaps from fifteen to twenty days, the two anterior incisors of the upper jaw come through: to these succeed the lateral couple of incisors in the lower jaw; then come those of the upper jaw. After these, the two molar teeth nearest to the lateral incisors of the lower jaw appear; then the first molars of the upper jaw. After which come the lower two canines; then the upper canine; then the two second molar of the lower jaw, and afterwards the corresponding molars of the upper jaw.

As far as my experience leads me to conclude, the great majority of children who cut teeth with any regularity pro-

ceed in their dentition in the train I have indicated, and the period occupied in the process is about two years from the appearance of the first tooth. Baumés, in his Treatise on the First Dentition (p. 21), says that it is not commonly completed till the thirtieth month of the child's age. He adds, "Chez un assez grand nombre, la dentition est terminée à deux ans révolus."

The teeth cut through the gums, for the most part, in the same order in which they ossify. It is curious to observe how vague has been the knowledge of the best anatomists on this subject. They have copied from one another without much reflection, and have, for the most part, related the precedence of appearance of the canine teeth to the first molares. Baumés and Rosen (see Rosen on Diseases of Children, translated by Sparman, art. on Dentition), men of experience, continue the error.

De la Barre is the first author, in whose excellent Thesis, (Paris, 1806, p. 12,) as far as I know, appears the correct train. Serres takes credit to himself for having first indicated it, and, in a nettled spirit, De la Barre finds fault with Serres for having stated "une chose que l'expérience dément positive-

ment." (See De la Barre, *Seconde Dentition*, p. 33.)

The approximation to a normal order of eruption of the first dentition, may be thus attempted :—

| Periods.                                         | Teeth.                        |
|--------------------------------------------------|-------------------------------|
| Seventh month after birth . . . .                | Two central lower incisors.   |
| Eighth month . .                                 | { Two central upper incisors. |
| Ninth month . . .                                | { Two lateral lower incisors. |
| About ninth or tenth month . .                   | Two lateral upper incisors.   |
| About twelfth to 14th month . .                  | { Four first molar teeth.     |
| 16th, 17th, 18th, 19th, -to 20th month . . . . . | { Two lower canine teeth.     |
|                                                  | { Two upper canine teeth.     |
| 23d to 30th month                                | Four last molar teeth.        |

There is no circumstance relating to growth more striking, or more curious, than the division of life into epochs. The climacteric years of the ancients were multiples of seven; and they were pretty accurate observers of the changes

which took place in the body at different periods. That there must be a rule regulating the grand epochs of development in a *perfectly healthy* individual, there can be no doubt. In the course of life, man appears, in the changes to which his frame is subjected, to go through several types of configuration: the same individual that had once, in the womb of his parent, the shape of a worm, and that subsequently rapidly traversed the types of other gradations of the lower animals, and became an infant breathing the surrounding air, is by no means to be recognized as *identical* with the vigorous man of thirty-five. His physiognomy alone points out the changes effected upon him, and we cannot doubt that there must be some ground for the vulgar observation that has come down to us, of the body undergoing remarkable changes during the course of successive climacteries. His progress through his varied types of configuration is dependent on the completion of each stage of his course. The measurement of time by chronometer—the indications of a completion of each advance of period—are illustrative of the trains through various successive types in the course of the



development of a perfectly healthy person. The circumstances relating to dentition are but an isolated set of phenomena. All the organs of the body should have their chronicles; but it will be found that they are the wheels and springs of the time-piece. The chief *index* is remarked in the organs of mastication, and they respond to epochs.

When the first dentition is complete, nature appears to rest. The teeth, in number and in size, being sufficient for the wants of the child, there seems for a time to be no further effort of growth among them. The principle of a continual progress is, however, established in the system. Though there is an apparent rest, there is, in fact, a real march in all parts of the body. The clock does not incessantly strike, but the hands are moving. The law which regulates the trains of growth throughout the body, insists upon an additional energy being communicated at certain periods to organs whose epochs of advancement to a type of more exalted perfection had arrived. It is not to be supposed that because the first set of teeth have all appeared, there is no change in progress in the jaws, or in the germs of the second set of teeth.

The jaws are gradually expanding, and as they are becoming larger, the capsules of the teeth of the second dentition are preparing the organs they have to build for assuming their stations.

Let us consider the changes undergone by the jaws and by the teeth of the first dentition. When the progress of growth has extended so far as to render the first set of twenty teeth insufficient for the purposes of complete mastication, they appear to become loose in their sockets: in reality, an absorptive process is established, and their roots are eaten away. The pulp having first decayed, the crown crumbles away from the gums. Normally, this change takes place in the teeth exactly in the order in which they were originally formed, and in which they cut through the gums. The central incisors of the lower jaw fall away first; then those of the upper jaw, between which the growth of the bone has created a very remarkable space; then go the interior lateral incisors; and so on. Before, however, any of the teeth of the first set fall out, the jaw has already acquired a considerable growth, and four molar teeth have appeared at the back of the existing twenty teeth. These four are permanent teeth:

they occupy a large space, and their relations to the first set and to the teeth which are afterwards to appear, will be more advantageously explained after some further anatomical inquiries; and these must relate to the organs concerned in supplying the first and second set of teeth with nourishment, and the history of the changes they undergo, in order that the deciduous teeth, and the processes of bone which belong to them, may vanish, and allow the permanent set to grow up and take a normal alignment.

How are the teeth in the infant nourished? Are there any remarkable differences in the distribution of the arteries belonging to the first, and of those belonging to the second set of teeth?

Serres, whose ingenuity and whose anatomical labours have acquired for him some reputation, asserts, that the usual description of the arterial distribution in these parts is incorrect, (*Essai*, p. 16); while De la Barre is at some pains to show that Serres is in error, and has based his theory of dentition on a very small number of facts, (*Seconde Dentition*, p. 65.)

The arteries that are given to the teeth come no doubt from the branches sup-



plied by the internal maxillary artery; but the question is, whether the dental artery of the lower jaw has, up to the period of the shedding of the first teeth, two branches, running in two separate bony channels. In the Descriptive Anatomy of Bichat, (tom. iv. pp. 157-8,) where the best account of the dental artery is given, there is not a word said of the branch supplying exclusively the germs and teeth of the first dentition. Considering the jaw of the adult alone, the course of the artery is stated with sufficient accuracy. The disposition described has been established in the course of the second dentition; but Serres would contend, that up to the period when a change takes place by the falling out of the first set and the development of the second set of teeth, the jaw is so much crowded by capsules, that there would be hardly room for the main dental artery to pass to the dental hole, and he asserts that in the fœtus and in the child up to six or seven years, there are two canals and two dental arteries.

The inferior artery, occupying the inferior canal, he says, is large in the fœtus, but its area increases up to the third or fourth year of the child's life; then it becomes smaller gradually, and

about the eighth or ninth year it is entirely obliterated. Sometimes, however, it lasts longer, and it has been found in a woman thirty-six years of age. In the child and in the fœtus, the dental artery is said by Serres to divide into two branches, between the condyle and coronoid process: one of these passes along the superior dental canal, and the other proceeds along the inferior. The superior artery up to three or four years does not require to be large in its area, its duty being to supply principally the germs of the teeth of the second dentition and the alveolar bands. The lower branch dips down into the inferior canal, proceeds in it as far as the first molar of the first dentition, without giving off any important branch: it gives a branch to this tooth, then it sends branches to the incisors and canines of the first dentition. Afterwards, it forms a full vascular network around the symphysis, and then proceeds through a hole under the canine tooth, where it anastomoses with the superior dental artery.—(Serres, p. 20.)

In the upper jaw, there does not seem to be occasion for two arterial branches. The germs have more space, and the dental branches of the superior maxillary

artery are distributed to the two sets of teeth in free pencils, unshackled in their course from above to the germs by a want of due space.

When flat denials are made to the statements of anatomists of such reputation as Serres, it must be confessed that the subject is not at rest. The developmental anatomy of the jaws requires further investigation. The veins of the teeth follow the course of the arteries, and at last unite, becoming the internal maxillary vein. The bloodvessels supplying the teeth are by no means of a proportionate small size; on the contrary, considering the organs they have to nourish, the quantity of blood they convey is large.

The same observation as to volume is applicable when the size of each nervous twig going to a tooth is considered, and it will be found that the sympathies propagated to various parts of the body generated by mischief occurring to the nervous parts of the dental matrices, the teeth, and the jaws, are very numerous. Anatomists have laboured well to make out the structure and distribution of the nerves of these parts. Derived from the fifth pair, they occupied the attention of Rau, who has given the ramifi-

cations of the fifth pair with great minuteness.—(Haller, Disput. Anat. tom. iv.) Vienssens followed the maxillary nerves up to the thread which is given to each tooth, and the elder Monro shewed that these threads went to the pulps of the teeth. But the fifth pair of nerves was a subject of intricacy and confusion until the genius of Sir Charles Bell unravelled the skein, and demonstrated the two distinct portions into which the nerve is separable; portions endowed each with a distinct property—the one sensitive, the other motor. The alliance which Sir Charles Bell has indicated between the fifth pair of nerves and the spinal nerves, may tend to dispel much of the intricacy which at present involves the connexion between irritations about the teeth and jaws, and the proneness to disease inflicted by them upon distant parts.

The dental nerves are branches of the superior and inferior maxillary nerves, which travel through their canals in the jaws. These supply the teeth of the second dentition. Serres asserts that the deciduous teeth are supplied with nerves from filaments of the maxillary nerves, which are lodged in channels hollowed out of the jaw-bone;

and he has given the name of dental plexus to an interlacing of these filaments at the base of the incisors of the lower jaw. This curious configuration of nervous tendrils is said to waste by degrees, while the deciduous teeth are disappearing. So much blood, such a mass of nerves going to the teeth, do we conclude that these organs are wanting in vital properties? Mr. Bell, in his work on the Teeth, has set this question at rest. It is not only the germs or capsules which require blood for the purpose of carrying on the formation of the ivory and enamel, but that the teeth require a pabulum is very evident. John Hunter opposed this conclusion; and Serres, Geoffroy St. Hilaire, and others, have advocated his views on the inorganic nature of the teeth. Mr. Bell very justly observes, that Mr. Hunter's view can be accounted for only "by the extreme caution which he always observed in deducing general principles from isolated facts, and by the apparent incompatibility of different phenomena which were presented to him, arising from his having neglected, in the present instance, to follow out the reasoning to which they naturally gave rise." (On the Anatomy, Physiology, and Diseases of the Teeth, p. 9.)



It is said that no vessels have been demonstrated by the process of injection. This cannot be allowed to be an argument of great weight against the existence of vessels in a tooth. The colouring matter of injections may be too coarse to permeate the delicate organization of so compact and resisting a substance as ivory. Mr. Bell states that jaundice affects the organic part of a tooth, rendering it yellow; and he had observed in persons who had died by hanging or drowning, the same "part coloured with a dull deep red." Teeth which have been pulled from the mouth and immediately reinstated, have sometimes adhered to the socket, but the colour of them is always different from that of the living teeth in their neighbourhood.

Let a fresh-drawn living tooth be contrasted with one that has been extracted a considerable time, and no doubt will remain as to the characters of each tooth. Indeed, Mr. Bell has, "on purposely breaking a tooth immediately after extraction, where the pain and inflammation have been severe, found *distinct red patches in the very substance of the bone.*" The observation of a case which occurred in the

practice of the same scientific dentist, is conclusive upon the existence, not only of blood-vessels, but of absorbents, in the ivory part of teeth. He found a cavity formed in the very substance of a tooth communicating with the natural cavity, and filled with pus,—an example of inflammation, suppuration, and absorption.

The existence of pain may be considered as a sufficient evidence of vitality in an organ. The touching of an exposed portion of the ivory of a tooth with a pointed instrument, usually gives pain to the individual. A fracture of a portion of a tubercle from a good molar tooth in my own mouth, has exposed some ivory. The application to it of the juice of a fresh currant, of vinegar, or of lemon-juice, causes great pain. There can be no doubt that teeth are organized bodies, and that the vessels and nerves with which they are supplied reach them particularly through the dental hole, but partly through the dental membrane surrounding the root, where it seems to be a medium of nourishment to the ivory. (See Serres, *Essai*, &c. p. 67.) The teeth and the jaws are under the influence of the laws regulating vitality: but the phenomena attendant

upon the progress of each, are liable to deviate from the norma of a perfectly healthy state. The definition of the conditions of the rule of health is by no means easy. An approximation to the truth, in our statements of the events in the progress of growth, is all that can be attempted; and the influences modifying health in civilized communities, as our vanity teaches us to call the present congregations of individuals in society, renders our efforts more difficult as we proceed. The difficulty arises from the want of a standard. Where numbers are influenced by surrounding circumstances to err in the progress of healthy development, it becomes very puzzling to establish a standard of normal growth as to epochs, and sometimes even as to just configuration.

How are we to determine the standard of a proper size and shape of the jaws? and how can the ratio of size of the teeth to the jaws be fixed but by repeated observations on numbers of perfectly healthy individuals? It must be confessed that large cities do not afford the requisite data.

The growth of the jaws has not failed, however, to attract the attention of anatomists. John Hunter, who saw the im-

portance of "a knowledge of the manner in which the two jaws grow," "to the understanding the shedding of the teeth," states that they "seem to differ in their manner of growing from other bones, and also vary according to age." In the fœtus, the jaw bones at various periods "increase in all directions, but more considerably *backwards*." "Till twelve months after birth the jaw still increases in all points, when the bodies of all the six teeth are pretty well formed; but it never after increases in length between the symphysis and the sixth tooth; and from this time, too, the alveolar process, which makes the anterior part of the arches of both jaws, never becomes a section of a larger circle; whence the lower part of a child's face is flatter, or not so projecting forwards, as in the adult."

"After this time, the jaws lengthen only at their posterior ends."

The whole force of growth is, in fact, directed from the posterior part forwards; and the influence of this law is very remarkable in determining the direction, perhaps the size, of the teeth, and in modelling, perhaps, the shape of the face.

As the individual grows, from child-

hood upwards, we see remarkable alterations taking place in the size and shape of his jaws. At birth the lower jaw has hardly any angle; but at fifty or sixty it is so well marked that its presence is not doubted. After that time, perhaps another change may be perceived. If at eighty the teeth are all gone, the lower jaw has lost its alveolar processes; and in shutting the mouth the chin is thrown up, projecting much beyond the upper jaw, and coming into a line with the articulation. The angle of the jaw disappears, evincing a type of configuration very different from that at the middle term of existence. The same changes, though in a less remarkable degree, are observable in the maxillary tuber of the upper jaw—a part which may be considered as corresponding to the angle of the lower jaw.

If the jaws, then, undergo such remarkable changes in the progress of life, it is not unreasonable to suppose that there may be many circumstances attendant on their growth which must influence the arrangement as well as the configuration, and even the structure, of the teeth, which are organized bodies, supplied with large blood-vessels and

nerves, and liable to diseases peculiar to their tissue. On the other hand, the development of the jaws themselves may, in a great measure, be dependent upon the relative progress of the teeth through all the phases of their existence.

De la Barre has remarked (*Seconde Dentition*, p. 96), that the growth of the jaws is dependent upon the successive development of the teeth; a truth which is but half stated, since normality requires a mutual influence, not sufficiently allowed for in our physiological reflections. The jaws and the teeth require, for healthy growth, a perfect consent, without which errors may be established in either. Let us inquire into the changes which take place in the structure of the jaws, as connected with the appearance and marshalling of the teeth of the second dentition, to which we may proceed after regarding the differences in the characters of the teeth of both dentitions; these present considerations evincing a difference in the types of configuration in the infant and in the adult, that are very remarkable. The teeth of the first dentition have consisted of twenty; of these, for each jaw, four were incisors, two canine, and four molar: these are sometimes called milk

teeth, deciduous teeth, temporary teeth. They differ from their successors in number, in being smaller, partly in the form of some, and in the want of completeness of gradation in type which the presence of a larger number can afford.

The most considerable difference between the teeth of the two dentitions is in the characters of the double teeth. In the first set, the molares have crowns stronger in proportion to the roots, and the crowns are less elevated than in the permanent teeth.

A comparison is sometimes instituted between the deciduous molares and the teeth which are to replace them; and it is said that the teeth of the first dentition are here larger than those of the second. The comparison is not fairly instituted, for the small molar, or bicuspid teeth, have none analogous to them in the first dentition; they constitute the link which was wanting to a perfect gradation of character, from the teeth of simplest configuration to those of more complex structure. In the upper jaw they have more room generally, and the root bifurcates; in the lower jaw the bicuspid more resembles a single tooth. The teeth of the first dentition, which have been replaced by these, had four or

five tubercles on their crowns, two fangs in the lower, and three in the upper jaw; so that they differ from bicuspid teeth in several important characters. The second molar of the first dentition is in every respect formed on the decided type of the double teeth, and far from having an analogy to a bicuspid, is, in fact, more bulky than the first permanent molar tooth.

How do the teeth of the second dentition proceed to displace those of the first dentition? Much absurdity has been published on this question. They do not displace the teeth of the first dentition. The jaws grow; they enlarge: as their volume increases, the germs of the permanent teeth continue to develop the organs they have to form. These germs are enclosed in cells in the bony substance of the jaws. Up to the age of five, six, or seven years, the jaws of a child may be said to contain two sets of *sockets*. Hunter, Blake, De la Barre, and Serres, use this expression, though it is not quite correct; for the teeth of the second dentition, though not yet perfect, are lodged in *cells* below, and a little behind, the alveolar processes of the jaw which belong to the first teeth. The cells of the second teeth occupy a



curve less extensive than the alveoli of the first, and are separated from these by a bony lamina, forming a kind of partition, which keeps the two sets of teeth quite distinct from each other.

The germs of the second set of teeth have long existed in the jaws. It has been remarked, that the germs of the first dentition are attached, in the fœtus, immediately to the membranous folds which, at this period, constitute the gums; and that those of the second dentition are suspended from them by means of small pedicles. When the capsules of the first dentition were advancing towards their development, and were approaching the upper part of the gum, those of the second dentition appeared to retreat into the depth of the jaw, and hung to the gums by their pedicles. The pedicle, in the progress of growth, is destined to perform an important part. It becomes a fibrous canal, communicating between the alveolar margin and the cell in which the capsule is lodged: it is apparently periosteum; but whatever may be its real nature, it leads to the tooth, and becomes continuous with the external layer of the dental membrane. The first account of the anatomy of this organization appears in the 7th and 11th pages

of a thesis, entitled "Dissertation sur l'Histoire des Dents, présentée et soutenue à l'Ecole de Médecine de Paris, le 31 Decembre, 1806, par C. F. De la Barre, de Lisiens." In his treatise "De la Seconde Dentition," the author calls the bony canal of this passage *iter dentis*. Serres, in 1817, laid claim to the discovery of this point of anatomy, and he gives it the title of *gubernaculum dentis*—affording an instance of the love of snatching and of appropriation which some men of science share with monkeys. Blake had described the pedicle, but he had not clearly seen the nature of it.

De la Barre tells us, that during the process of dentition, (Seconde Dentition, p 66,) the alveoli of the replacing teeth assume the shape of almond shells, and the extremities pointing to the gums terminate in a little bony canal directed obliquely forwards, and opening by an oval orifice behind the teeth of the first dentition. This is the *iter dentis*, which serves as a sheath to the appendix of the dental membrane.

De la Barre has the merit of pointing out the structure of the tubal appendix of the dental sac; but when he gave the name of *iter dentis* to the bony canal of the maxillary cell in which the perma-

nent tooth is contained, he should have reflected that Albinus had written on the question, "*Quot dentes mutet puer, et quos?*" (*Annot. Academ. t. 3, e. 3,*); and that he had given a very minute and accurate account of the bony canal extending to the margin of the jaw, concerning the discovery of which De la Barre and Serres would each wish to be considered as the claimant. The developing teeth of the second dentition, lodged in their separate cells, continue to become more perfect; the cells in which they are contained enlarge; the appendix of the dental membrane becomes infundibuliform; and if the progress of the tooth be normal, it continues its course in such a direction as to reach its place through the channel and the aperture formed in the jaw-bone by the modelling process of absorption around the course of the appendix of the dental membrane. But before the teeth of replacement appear, the jaw should be prepared for them by a due enlargement, and by the shedding of the milk or temporary teeth. Occasionally the jaw has not sufficiently enlarged; the teeth of the first set have not fallen out. This is an anormal state, and the two sets of teeth are in the mouth at the same time;

the permanent set behind the others, according to the type of configuration in the mouth of the shark. When the norma obtains, the question is—what is the progress of change in order that the jaw shall discard its first teeth, expand, and proceed to allow a proper alignment of the second set? John Hunter says, that in the upper jaw, the “tubercle is no more than a succession of sockets for the teeth, till they are completely formed.” — (P. 103.) The continued growth of the lower jaw at its posterior part, may allow of the same expression regarding the base of the coronoid process. The first manifest change in the child’s mouth is here. This part elongates, and when its size is sufficient, the first permanent molaris makes its appearance, and takes its place behind the last deciduous double tooth. The child had twenty teeth. When the first four permanent molares are quite through the gums it has twenty-four teeth, and has not yet shed one tooth. At what age do the first four permanent molares cut? From my own observations, I should state the epoch to be about six years. Soemmering says, seven or eight, (De Corp. Hum. Fabr. t. i. p. 193.) De la Barre says, five or

six years, (Secon. Dentit. p. 112.) Bell gives six years and a half as the time, (On the Teeth, p. 79.) I have seen these teeth through at the age of three years and a half,—undoubtedly, an instance of precocious development. I have seen the first four incisors gone before they appeared,—another abnormal condition as to epoch of development.

The force of growth having its direction principally from the posterior parts forwards, an expansion of the whole maxillary arch results. The curve described by the cells in which the permanent teeth are lodged, is smaller than that of the deciduous teeth. The curve of the alveolar arch of the permanent teeth will be much larger: as growth proceeds, spaces between the deciduous teeth become remarkable; the bone for a time is looser in its texture anteriorly. The space in the upper jaw, between the two central incisors, is very striking. About six years and a half or up to seven years, some of the first teeth begin to loosen. Normally, they are the two lower incisors. The pairs of teeth that should loosen in succession, are those which have first cut through the gums. Three or four weeks after the first pair begin to loosen, they drop out. If the

process of absorption goes on healthily, there is nothing left of the tooth but the crown. The root is absorbed. The means by which absorption is conducted, are precisely analogous to those first described by my friend, Professor Macartney, as occurring in the removal of the sequestra of necrosis, (see Crowther on the White Swelling, p. 183.) From the membrane lining the alveolus, a new organization sprouts, of a granular nature: it is an absorbing organ, and is applied to the root of the tooth in a longitudinal direction. Grooves may be seen in the fangs of deciduous teeth drawn after the absorbing process has commenced, evidently the result of absorptive action upon the part. The *fleshy tubercle*, described by Bourdet, (Recherches, &c. p. 52,) and the *fleshy button*, by Laforgue, as the instruments for the destruction of the roots of the deciduous teeth, are, in fact, the granulations I have noticed. (See Laforgue, l'Art du Dentiste, p. 99.) De la Barre's account of the organization and its duties is, however, a little fanciful.

The teeth, before they are submitted to absorption, are dead and extraneous bodies. How does it happen that they die?

The arterial twigs which nourish the teeth of the first dentition by a curious law that regulates this process, obliterate first under the incisor teeth. Their nourishment is gone; they die, and are then sequestra. Successively the twig of artery sent to each deciduous tooth goes in turn, until the process is complete.

It would be almost idle to discuss the question as to the absorption of the teeth, and some part of the jaws, during the transition state between the two dentitions, if some of the best works on anatomy had not continued to adhere to the obsolete views promulgated up to the time when John Hunter wrote. Van Swieten says (*Comment. t. iv. p. 744.*) "*Fateor quod mihi longe probabilior videatur opinio, quæ statuit, dentes lacteos carere radicibus;*" and though this opinion of the milk teeth being deficient in roots, had not attracted many advocates, there are not wanting persons who consider, that the first set of teeth are worn by the attrition of the second set, and so in time drop out (see Meckel, *Man. d'Anat. t. iii. p. 356.*) Van Swieten observes, "*Ab attritu secundi dentis assurgens hoc fieri non posse, ex dictis patuit evidenter.*" He has argued well

against this position, especially when, in adducing the views of Bunon, he says, "*præterea parva distantia observatur inter dentem primum et secundum.*" The teeth are, in fact, so distinctly lodged, so well separated, that they are at no time in contact. The one set are not placed immediately under the other. In some cases, when the milk teeth fall out, the succeeding teeth are yet some way distant from the place which was occupied. Perhaps there may be but a small part of the space occupied left; for the absorption of all the old parts depends upon the law of evolution, which has from the interior unfolded those parts of the jaw which now exist. It is an *evolution* attended by an absorptive and a modelling process (see Hunter on the Teeth, pp. 98, 99, 100; )—an evolution dependent upon the forces of growth exerted from the posterior parts of the jaws—forces which act with an energy, and, when the trains of growth are abnormal, produce an amount of pressure against resisting forces, which are very remarkable. When the trains of growth are normal, the current of nourishing material flows forward, and the parts in the interior of the jaws are evolved, and each takes its due station, the *pressure*



from behind favouring the turning off of the deciduous structures, which are absorbed in due course. A question, that has been the source of some confusion, has been asked about the replaeing teeth:—what teeth occupy the spaces previously held by the twenty teeth of the young child? Four molar teeth of the permanent set appear behind the twenty,—one behind each last molar tooth of the first set. This one is placed in each side of each jaw behind five teeth, counting from the median line. The first that drop out are incisors; next to them is a canine tooth: these are replaced in their *proper turns* by incisors, and by a canine tooth. Behind these are two deciduous molar teeth, to be replaced by two bicuspid teeth. These are the only replacing teeth. Those which come afterwards are altogether eight in number, two on each side in each jaw — molar teeth, appearing later in life.

Let us inquire into the epochs for the appearance of all these teeth. We have seen that the two deciduous central incisors of the lower jaw belonging to the first set, fall away about the age of seven years. The vacant spaces are soon to be occupied by a couple of incisor teeth, which cut through the gums, with edges

that are serrated—an appearance that time takes away. When these teeth are half-up, the two superior central incisors fall away, and are succeeded by two much larger teeth. In consequence of the want of a perfectly normal instance of healthy growth, it is very difficult in London to fix the time when the next two incisors, the lateral of the lower jaw, should fall out. Irregularities in this respect are very numerous; for the perfect consent between the growth of the teeth and that of the jaws, is wanting. The common occurrence is, that of a pressure from deficient growth of the jaw turning the newly-arrived central incisors out of their line for a time, producing an angle at the median line, instead of a continuous arc; and their backs appear to be pressed towards each other. In most cases the jaw increases in time, and the teeth assume their proper stations. About a year is occupied in the shedding of the four central incisors, and another year in that of the four lateral incisors. The anterior bicuspid teeth of the lower, then those of the upper jaw, are next to be shed; these occupy another year. The posterior bicuspids follow, and then comes the turn of the cuspidati, or canine teeth.

very often the canine take the precedence of the posterior bicuspid. The falling out of the posterior deciduous molares and canine, and replacing by these teeth, is a process that lasts from about nine years and a half till twelve. In the meantime the jaws manifestly enlarge, particularly at the posterior part. Spaces are found behind the first permanent molares: these teeth appeared at six years of age; and before thirteen years and a half, four new molares are cut.

The individual has now completed the development of twenty-eight teeth, and is ready to encounter the further unfolding of the frame, which is implied by the changes attendant on puberty. Three or four years seem to be required for a due perfection in the growth of the organs of reproduction; and during the remainder of this septenary period, the system adds accretion to the body, while four new molar teeth are put forth, completing the full number of thirty-two teeth in the mouth. These last four, cut between seventeen and twenty-one years of age, are the wise teeth, or *dentes sapientiæ*.

A recapitulation of the order and

periods of these changes may be proper.

| Periods.                        | Teeth.                                                                                                                                                                                                          |
|---------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Six years . . }                 | First four permanent molares appear.                                                                                                                                                                            |
| Seven years to eight years . }  | Two central incisors of the lower jaw fall out, and are replaced by the two permanent central incisors. Two central incisors of the upper jaw fall out, and are succeeded by the large permanent incisors.      |
| Eight years to nine years . . } | Shedding of the lower lateral, then of the upper lateral incisors, and their replacement by permanent teeth.                                                                                                    |
| Nine years to ten years . . }   | Shedding of the first deciduous molar teeth of the lower jaw; their replacement by the first bicuspid; then of the first deciduous molar teeth of the upper jaw, and their replacement by first bicuspid teeth. |

| Periods.                                  | Teeth.                                                                                                                                                                           |
|-------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 9 years and a half to 12 years . . . .    | { Shedding of the posterior molares of the lower jaw, or of the canine teeth, and their replacement ; then those of the upper jaw, the molares being replaced by bicuspid teeth. |
| 12 years to 13 years and a half . . . . . | { Cutting of the four second permanent molares.                                                                                                                                  |
| 17 years to 21 years . . . .              | { Cutting of the four third permanent molares, or wise teeth.                                                                                                                    |

These periods are given, but not with too much confidence, as an approximation to the normal periods for the appearance of the teeth of the second dentition. My own observation has led to these results ; they do not very materially differ from Bell's table (Bell on the Teeth, p. 79), although they do in some respects from the periods laid down by Serres (*Essai, &c.* pp. 115, *et sequentes.*) It is no easy matter to esta-

blish the normal epochs\* ; if it were, the observations I have to adduce on anomalies of dentition, and coincident states of disease in other organs of the body, would never perhaps have been made. Having given a view of the physiology of normal dentition, I propose to shew that its anormal states are

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\* A courteous critic, in the number of the Medical Gazette for Nov. 16, 1833, (page 237) has published the subjoined table of the order of the eruption of the first dentition observed by Sir Richard Croft, and has corroborated it by his own experience. I fully agree that "all authority must yield to fact"; but my critic and I are, *in limine*, disagreed upon the meaning of the term *normal*. The anatomical views I have adduced tend to shew that the order cannot be *normal*. To establish a normal series, our sphere of observation should be among *perfectly healthy* children. The variations from the train in Sir Richard Croft's table are very numerous, from the want of consent between the growth of the teeth and the jaws,—a consent which, if quite *normal*, must be attended by an eruption very different in its course. In the meantime, there is some use in recording the fact, that in civilized society, as at present constituted, a frequent repetition of one order of eruption takes place, opposed though it may be to anatomical norma ; —that there are certain laws, producing the frequent recurrence of a given aberrant series of developmental trains. I have purposely, in the first part, avoided the history of anormal eruption, in the hope that the exhibition of the importance of the subject might induce others to study deve-

often coincident with diseased conditions of other parts of the body.

lopments as I have done, and to record examples of anormality. My worthy critic, not having reflected upon the laws regulating aberrant series, has little idea of the extensive considerations they involve.

*Sir Richard Croft's Table of the Eruption of the First Dentition.*

| Molars |   | Canine | Incisors |   |   |   | Canine | Molars |    |            |
|--------|---|--------|----------|---|---|---|--------|--------|----|------------|
| 9      | 5 | 7      | 3        | 2 | 2 | 3 | 7      | 5      | 9  | Up.<br>Jaw |
| 10     | 6 | 8      | 4        | 1 | 1 | 4 | 8      | 6      | 10 | Un.<br>Jaw |





ON  
DENTITION,  
AND  
SOME COINCIDENT DISORDERS.

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PART II.

THE preliminary inquiries relating to the course of events constituting normal dentition have been gone through ; and if the meaning of the investigation have not been clearly expressed, the ulterior objects of our inquiry will be ill understood. Have we determined the standard of normal growth about the teeth and jaws? We have as yet, in our efforts to arrive at a severe definition, approximated only to the object of our desires ; and it is feared that the approximation, such as it is, may be still wide of the truth.

As far as we know of normal periods, they have been defined. We have then to ask—What are the *inconveniences* resulting from anormal trains of growth

in the teeth and jaws? The question has two sides; the one relating to the local inconveniences; the other to those which arise in the frame generally. The division is artificial and unphilosophical; but it is adopted because it answers our purpose, for the sake of limiting the extent of our observations.

We see very few persons who have not suffered more or less severely in the mouth, from the local consequences of anormal dentition. It would be very trite to speak of the common occurrence of tooth-ache; yet the subject of the influence of anormal growth in the production of diseases of the mouth, has been very little investigated. It is generally acknowledged as a fact, that children suffer more or less during the progress of dentition; and that very few adults are seen with a perfectly normal condition of the mouth; indeed, so rare is the occurrence of a normal state of the teeth, that the beauty of a fine set of teeth is a striking object of admiration. The local inconveniences resulting from anormal trains of growth in the teeth and jaws are not few. The surgeon is already well acquainted with this part of our subject. Among them may be enumerated those congenital defects

more or less allied to the fissure we know as hare-lip: irregularity in the curved alignment of the teeth; decayed teeth; other diseased states of the teeth; inflammations, abscesses, and tumors, resulting from these, or from irritations in the course of growth to the jaw bones, muscular, cellular, and glandular tissues of these parts. The mouth, the throat, the nostrils, the palate, and all the neighbouring parts, have disease inflicted upon them occasionally, by anormal conditions of the teeth and jaws. This is too well known to require observation just now; our present pursuit is the investigation of the other side of the question, that which relates to the coincidence of disease in other parts of the frame with anormal states of dentition.

If we wish fully to reply to the question, What are the coincidences of disease in other parts of the frame with anormal dentition? we must have a knowledge of the very various tendencies which may exist in different parts of the frame in alliance with the tendencies about the teeth and jaws, and even of the *slight degrees* of erroneous action in the system, resulting from irritation to the skin or to other villous textures, parts of the dermoid systems, and of the in-

fluence exerted by these upon the nervous system. Looking extensively upon the subject of developments of various organs of the body, we should inquire into the coincidences of anormal structure in these with anormal configuration in the parts which form the more immediate subject of our inquiry, and we shall often find that anormal developments in one part of the body are linked with errors in other parts. We may find too, that where error exists, the degree of it may not be very serious; or, on the other hand, according to a gradation of circumstances, the accruing mischief may entail consequences of vast importance. If the subject be regarded in this manner, the anormalities attendant upon dentition will be found not to be confined to the period of childhood. A review must be taken of the symptoms of disease to which children are liable in the progress of their growth; and the state of knowledge up to the present time being assumed to be given in the latest works, which, by common consent, are allowed to be authorities, we must proceed to the analysis of these symptoms.

It will be found that most of the complaints of children can be grouped into

one family; that they can be elassed under one general head; and that, for the most part, they form the symptoms of one disease, the existence of which depends upon irregularity—upon *anormality* of growth. It is not intended to confound the specific diseases arising from contagion, with the symptoms of irritation arising in the progress of faulty growth. How much soever the pathology of one train of evils in the system may elucidate other trains, care must be taken not to trench much upon inquiries too far wide of our present subject.

Most of the complaints afflicting children are referrible to cerebral or nervous irritation, the various symptoms of which are parts of the disease called hydrocephalus acutus, or water in the head. The manifestations of irritated nervous centre, constituting this morbid state, it is proposed to consider, as our illustrations may permit, separately. The start in sleep; the moaning in sleep; the shivering fit; the slight thrill, hardly a rigor; the flush of countenance; drowsiness; heat of skin; perspiration; neuralgia; spasmodic twitchings of certain muscles; continued spasms of certain muscles; squinting; wry neck; looked

lower jaw ; spasmodic croup ; intussusception ; chorea ; epilepsy ; catalepsy, and its minor degrees, apallment, forgetfulness, nervousness, and stammering ; tetanus and coma ; diarrhœa and costiveness ; deafness ; and amaurotic blindness, are parts of hydrocephalus. What is the object in regarding these in their disintegrated state ? To show that either in a *slighter* or a *severer* degree, each one or more of these conditions of irritated nervous centre may be coincident with anormal dentition.

This is a new mode of regarding the acute water in the head ; but are these the only views that offer themselves from the point of aspect we have chosen ? We know that the skin and its appendages, and the mucous or villous surfaces of the body, are closely knit together in the analogies which they offer ; and that irritations to the nerves connected with one part of these systems, are curiously responded to by disordered conditions of some other part. There is a medium through which the message is made to travel. The nerves proceeding from the mucous surfaces of the intestines take their course to the brain, where they are intimately associated

with nerves arriving from either some part or parts of the skin.

In the diseases which appear to result from the local changes consequent upon the inoculation of a morbid fluid upon the skin, the connexion between the constitutional signs and the local change of structure, is still very obscure. I tried to investigate this subject fourteen years ago, when I was physician to the Hospital for the Small-pox. Endeavouring constantly to look in the direction of anatomy, I established some new points. (See a paper in the 27th No. of the Medical Gazette, vol. ii.) It being an object to discover the specific change of organization in the skin which is the antecedent to, or the coincident with, certain trains of cerebral irritation, my researches on the anatomy of the variolous poek have carried on the investigation one step.

In variolous diseases, in hydrophobia, in syphilis, and in some other conditions of irritation or poison applied to the villous part of the skin, there would appear to be a process carried on under the direction of certain laws, which would seem to imply a connexion of an intimate nature between the dermoid organs and the nervous centre—an alliance

vaguely and loosely expressed by the use of the word sympathy. Dr. John Clarke well observes (Commentaries on some of the most Important Diseases of Children, pp. 96, 97), that "all the arguments founded on the doctrine of sympathy and irritability are drawn *ab ignoto*; and it seems much more conformable to reason and observation to infer, that such \* \* \* affections arise from *some derangement of organization, however temporary*, than to resort for an explanation of them to imaginary causes, and such as offer to the mind no satisfactory conclusions."

The fact is, that certain states of the dermoid system, and certain states of the nervous system, are coincident; or that the one immediately preceeds the other. The coincident or antecedent, and consequent events, may vary according to the peculiarities in the structure of the individual, which it has been usual to express by the terms temperament and idiosyncrasy; or they may vary according to the condition in which the individual, or parts of the system, may happen to be at the time. Taking the subject of dentition, and the relations of its anormal states, parts only, be it remembered, of the development of the whole



organism, as the topic of our inquiry—seeing the manner in which the complicated organizations of the capsules, teeth, and jaws, are related to each other, and connected by the medium of the fifth pair of nerves with the brain—seeing some reason from the anatomy to class the teeth with the dermoid systems, and seeing analogous phenomena exhibited by disordered conditions of these parts and of those systems, we are left to trace the circumstances that can fairly be classed together. If, in the progress of our investigation, we can perceive that offences against the healthy integrity of the dermoid systems are responded to by the occurrence of events analogous to those which are coincident with pressure, or other minor mischief, to the nerves connected with the dental pulps, we shall have additional reasons for arranging the teeth according to the classification of some of the great comparative anatomists.

Taking this view of the subject, we shall be enabled to understand how, besides the infantile remittent fever, and the acute water in the head, or their individual symptoms, various diseases of the skin may be coincident with abnormal dentition, or vicarious with the dis-

eased states to which allusion has been made. The field thus opened up for investigation is very extensive ; and when we consider the limited range offered by confining the attention to the anormal development of one set of organs only, we shall be tempted to examine the relations of these to that of other parts, and thus wander into regions that, to the unreflective, would appear to have no connexion with our subject.

If the proposition had at any time been put forth, that anormal states of dentition were invariably and immediately the *causes* of serious disorders of health, a doctrine would have been advanced which the experience of most medical men would have enabled them to subvert at once. The country practitioner more especially would instantly put his negative upon the assertion ; for in his experience, unless the district in which he practises be a marshy country, or have circumstances about it depressive of the vital forces, anormalities in development are, for the most part, compensated by the energy which a pure and invigorating atmosphere communicates to the nervous system. In the country, obstacles to the normal progress of growth in the teeth and jaws, may,

and occasionally do, intervene; but the forces of the constitution are in most cases sufficient to overcome the inconveniences resulting from them. In London, and in large towns, it is different; errors in the progress of growth communicate their influence to various organs; and according to the tendencies of the constitution, according to the *idiosyncrasies* of the individual, or according to the condition in which surrounding circumstances may have for the time placed him, the mischief, which may vary certainly in degree, is felt in one set of organs or in another. Unless much more were known of the precise coincidence which a certain anomaly may require—of the precise trains of symptoms indicating certain erroneous trains of growth—it would be impossible to point out the diseased states and irregular developments that are linked with each other.

We are not aware fully of the coincident events connected with development, which take place in the earlier periods of infancy—a time of life when the mobility of the frame, and the rapidity of change in the course of growth, render their consequences so striking. In pointing out, therefore, the links in the chains

of diseases which hang on irregularities in the course of development, the most that can at present be attempted is to trace analogies; and even in this task, the complications that beset every event in the animal economy may tend to confound us, and to lead us wide of the direct line of our inquiry.

Regarding the infant, we ask if coincidences of disease with anormal dentition can fairly be traced before the usual period of cutting the teeth? Superficial observers have a fashion of scouting ideas inconsistent with the notions they have imbibed from their masters. We know well that children, at very early periods after birth, are the subjects of convulsions. Irritations upon the skin may be vicarious with these epileptic attacks, or irritations upon the mucous part of the alimentary canal may affect the nervous centre. Why may not a turgid state of vessels about the dental matrices, in the simpler and less complete conditions of organization belonging to this period of life, immediately compress the dental, or even the maxillary nerves? The subject of convulsions in earlier infancy is yet involved in considerable obscurity, and if we shall at a future time see reason to approach

the conclusion, that pressure applied under certain conditions to a nervous tendril of a motor portion of the fifth pair is nearly tantamount to pressure applied to certain parts of the brain, we may well believe that irregularities in the course of growth at the earlier periods of infant life may produce pressure that shall be succeeded by convulsions. Perhaps pressure or other irritation, applied to a sensitive nerve, may be succeeded by *tic douloureux*, or a slighter neuralgia.

A fine healthy-looking child of a strong Irish woman died at thirteen weeks of age, of a convulsion fit. My suspicions as to its having had improper food were not well founded. The mother was anxious to have the cause of death ascertained, and I found no difficulty in obtaining leave to open the body. The organs for the most part were healthy; the stomach contained only a little milk; no error upon the mucous surfaces of the intestines. Skin perfectly healthy. The contents of the thorax, as well as those of the abdomen, were quite healthy. In the head there was a slightly injected state of the vessels of the pia mater, but in other respects the brain was quite healthy. The capsules

of the incisor teeth were large and very vascular, much more advanced than usual. With a lancet the cartilaginous rim of the lower jaw was attempted to be removed, with a view of exposing the capsules of the molar teeth; but these were so unusually distended with fluid, that the instrument cut into them and let it out. This was an example of development proceeding too hastily.

Convulsions frequently occur in coincidence with a development which is too hasty in its progress. They arise from the same state of nervous system which, under a less severe degree of irritation, is productive of partial spasm. Pressure on a nervous tendril supplying a dental capsule is, perhaps, at first attended by twitchings of only the flexor muscles of the hand and arm; then of the muscles about the angle of the mouth, cheek, and eye-lids; then, may be, the parietes of the abdomen harden. The associations of nerves all over the body are so extensive, that it would be difficult to say what set of irritated nerves may induce general convulsions. An irritated portion of the mucous surface of the colon may be coincident with spasm of the calf of the leg, or of the abductor of the great toe. They who are accustomed to

visit the lying-in chamber, know that women in labour often suffer from severe spasms in the legs, coincident with irritation about the neck of the womb. The persons who have suffered from these cramps, may perhaps have no further irritation in the nervous system. The nerves only, whose functions relate to these parts and to those in their district, may have been irritated. The mischief is restricted to a part. All the nerves, those productive of more general symptoms or convulsions, may not be affected. It is clear they are not in every case necessarily affected; but they may become affected; for spasms of particular parts are in many cases forerunners of convulsions. The degree of spasm being at first slight, is afterwards aggravated, and, neighbouring nerves being associated, is produced into the most severe form. Dr. John Clarke (*Commentaries, &c.* pp. 88, 89), writing with great practical sagacity on these subjects, has said, "A bending of the toes downwards, clenching of the fists, and insertion of the thumbs into the palm of the hands, and bending the fingers upon them, is sometimes found not only during the paroxysms, but at other times."

“Clenching the fist, with the thumb inserted into the palm of the hand, often exists for a long time in children, without being much observed; yet it is always to be considered as an unfavourable symptom, and frequently is a forerunner of convulsive disorders, being itself a spasmodic affection.

“It rarely happens that a child recovers from an attack of this sort, unless the progress of the disorder has been interrupted by a timely application of proper remedies, without a general convulsion.”

I attended a fine boy from the cutting of its first incisor tooth to the completion of its dentition of twenty teeth. It was the last child of a family in which all the children had afforded examples of anormal dentition. This boy was of a nervous temperament, with black hair and eyes. Every tooth had come forward with a want of biliary secretion. Nothing could exceed the care observed by the watchful mother, as to the diet of this infant; yet, whenever an effort at developing a tooth took place, she was always aware, from the deficiency of bile in the evacuations, that he was to have slight fever, sometimes with a catarrh and cough, always



with twitehings of the face and fingers, and starting and moaning during sleep, and a catch in fetching a deep sigh. With the appearance of the four first molars the spasms were more severe. The thumb of the right hand was thrust into the palm, and the fingers clenched upon it; the toes were drawn down; the face was distorted. These spasms relaxed and reappeared. I found, on these occasions, that the tooth was always anormal in its progress; seldom observing its turn, and never its time. The gum-lancet freely used always cured these spasms. On the last occasion, I was sent for in great haste, for the spasms had been continued into an epileptic fit; from which I speedily and effectually relieved my little patient by cutting through the capsule of the coming tooth.

I was called one evening to the child of a lady in Regent-Street. It was a fine girl of fourteen months of age. The head was large; dark hair; dark eyes. It was in a tub of warm water, quite insensible, passing from the state of epilepsy into tetanus. Its eyes were not influenced by light; the pupils remained dilated. The anterior molaris of the left side, in the upper jaw, was ready to come through. I cut freely

through its capsule with my gum-lancet; in two minutes the child was on its knees in the water, playing with the handle of the tub, in excellent spirits. This child had been twitching the angle of its mouth, and had had its right arm spasmodically affected, during the day. (See Hunter, Nat. Hist. of Human Teeth, part ii. p. 126.)

To enumerate cases like these would be not at all difficult. No practitioner, conversant with the disorders of infants, will deny that, while the teeth are troubling them, they are apt to be convulsed. (See Hurlock on Dentition, Introd. Pref. p. xix.)

Although convulsions, or epilepsy, be not so common during the progress of second dentition as they are in the earlier development, yet many cases occur in which their presence may be attributed to pressure, opposing the progress of growth, and thus irritating certain nerves.

A boy, twelve years of age, was cutting the second or posterior permanent molares of the upper jaw, before those of the lower, and the process was accompanied by twitchings of various parts of the body. At last he became affected with chorea. Being a very nervous lad, if any notice were

taken of him, he would quite involuntarily make the most extraordinary faces, and contort his body into various attitudes that appeared to be most difficult and painful. This chorea continued for three months, during which time a variety of medicines were swallowed. At last he fell into an epileptic fit, struggling much, foaming at the mouth, and grinding the teeth. I thrust my fore-finger along the inside of his cheek, and found a hard cartilaginous space on each side, behind his first molar teeth. I succeeded in gashing these parts: he uttered a scream, and fell out of his fit, becoming quite sensible; nor had he a recurrence of his chorea.

A young gentleman, twelve years of age, with dark hair and eyes, greasy countenance, lymphatically stout, was removed from school, and sent to some relations in the country on account of being attacked by chorea. His bowels were costive; he had offensive breath; he started and moaned in his sleep. Something unpleasant to his feelings occurred in conversation, and he fell into an epileptic fit. On recovering, he was placed in bed, where he slept soundly for two hours, and on awaking was perfectly unconscious of having had

a fit. During the next fourteen months, this boy had many recurrences of his fits, and though much medicine was swallowed, nobody thought of the probability of his cutting teeth. In shewing me the young man at eighteen, his father said he had had no fits for four years: he supposed he had "*outgrown*" them,—a truth spoken without reference to my hypotheses.

A lady, with dark hair and eyes, tall and handsome, of a highly nervous temperament, married at the age of nineteen; and was pregnant of her first child about eight months, when she was seized with an epileptic fit. She had for several months been affected with twitchings in her cheeks, and "live blood" was often very troublesome in her left eye. The epilepsy recurred twice before her labour, which was a very favourable one; and she had a very good getting up. She nursed her child, which thrived very well. At the end of seven months from her delivery, twitchings came on again, and she had at last another epileptic fit. They came on now twice, sometimes three times, in the week. The best physicians—some of the best surgeons—were consulted. The digestive organs were attended to, and she

took various medicines. The fits came on at longer intervals; then, sometimes, two appeared in a day. I saw her first when she was twenty-two years of age. I was expressly told that she was placed under my care, with no hope of her recovery, but merely that I might look to the general regulation of her health. My first office was that of consulting-dentist, for I gave her an opinion upon her teeth, which was to the effect of condemning her to lose seven decayed molares. One of these was the only wise tooth she had cut. Three other hard cartilaginous obstacles to the progress of her teeth were removed, and this lady has had several years of freedom from epilepsy.

A young woman, nineteen years of age, of light hair and fair complexion, of fine tall figure, rather fat, was, in the year 1818, apprentice in a straw-bonnet shop, in Hayes's-court. Her occupation was sedentary, and she had not been in the habit of paying attention to the state of her bowels: they were suffered to be very costive. For several months she had perspired profusely at night, and her breath had been observed to be very offensive; she started in her sleep, and had repeatedly awakened her bed-fellow

by kicking her on these occasions. She moaned and talked in her sleep. Dr. Nuttall, who was my colleague at the Westminster General Dispensary, was suddenly called to her, on account of her having fallen into a fit. He caused her to be profusely bled, and she recovered so far as to be able to see her physician at the dispensary. Three weeks afterwards, the doctor being from home, I was obliged to see this patient in a fit similar to the first she had had. I learned that she had been very odd and nervous in her manner, and had often suddenly screamed out from cramps seizing her toes and the calves of her legs, which were succeeded by her thumb being drawn in towards the palm of her hand, and her fingers being clenched upon it. I found her in a state of tetanus. The convulsion was over. I thrust my fore-finger into her mouth, where I found the wise teeth of the upper jaw through. In the lower jaw the teeth could not get through, for there were hard cartilaginous substances in their way; through these I scored freely, and the young woman was relieved instantly.

I was called last year to Upper Marylebone-street, in the night, to see the daughter of a very honest and indepen-

dent tradesman. She had been attended for the fit in which I saw her by two medical friends. The parent's anxiety made him apply to me. The patient was a fine young woman, of nineteen, with dark hair and eyes. She was stiffly curved in tetanus. I asked her sister if she knew whether any wise teeth had lately been cut. Upon her answering in the affirmative, I took a gum lancet, and relieved my patient instantly, by cutting through the obstacle to the progress of her wise tooth, in the right side of the lower jaw.

The gradations of partial spasm of the flexor muscles, loss of consciousness, clonic spasm, epilepsy, proceeding to stiffening, with continuation of spasm along the dorsal muscles, occurring in close coincidence with obstructed dentition, can leave no doubt of the dependance of the phenomena upon the progress of development.

Can we doubt that chorea and epilepsy are but more intense forms of the contractions which we know as convulsive spasms? — severer *degrees* of spasms? — a greater number of nerves being associated and involved. But the laws which regulate the production of spasm are so little understood, that we

have no means of indicating the limits of the various *degrees* of severity. We know not what determines chorea, or when, or how, this disease glides into epilepsy. We know not how, in one case of chorea, great stammering exists, while in another there is no impediment to speech. The circumstances in the "*temporary derangement of organization*" of the nerves productive of these phenomena, it will perhaps require a long time to define. How is it that there are cases in which a complete loss of the power of speech takes place on recovery from an epileptic attack? When I was physician to the Parochial Infirmary of St. Paneras, in 1818, a fine young woman was in the workhouse, endowed with intelligence, and who was withal a docile and gentle creature, that had lost the power of speaking after recovery from an epileptic fit. Her endeavour to articulate ended always with a very melancholy repetition of "*ame-same.*"

I was called to the groom of a gentleman residing in Davies-street. The man was early in the morning endeavouring to mount the box of a break, and with the reins in his hand fell down in a fit. He was lucky in having Mr. Parrott, of



Mount-street, called to him directly; he was very properly treated, and consciousness soon returned; but it was found he was paralytic on the left side. He was freely bled and purged, and the power of his side was quite restored in a couple of days; but though he understood all that passed around him, he could answer only "yes" and "no" to questions put to him. I observed that he had a supernumerary incisor tooth, which appeared to crowd his mouth. Every tooth was tightly wedged against its neighbour. In looking into his mouth there was found to be sad decay of the double teeth. I prevailed upon Mr. Parrott to remove seven of the remains of these, under the idea that they might be acting as irritants to the nerves of the jaw. At my next visit I was glad to find that the man was recovering the use of his speech. Several months afterwards I learned that he was quite well, and had had no recurrence of his fit.

Stammering, and the loss of the power of speech, are intimately allied to spasm. The *tardy* development of the power of speech may be considered as resulting from "a derangement of organization," an entanglement of developmental trains, quite analogous to the circumstances

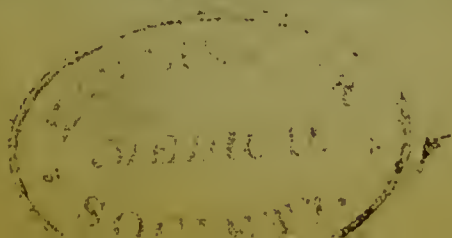
productive of these. That the mind should be clear and intelligent—that the expression of countenance in a child six years of age should indicate the possession of an understanding even beyond his years, and yet that he should never have spoken, although he was not deaf, appears strange. What entanglement of development was there that prevented the mind from commanding the organs concerned in articulation? The jaws had always been too small for his teeth; they took a start in growth; the first permanent molares were cut; the spaces between the teeth became wider; the pressure was taken off from the dental nerves; the organs with which they were associated in error were free; and the boy soon learned to speak. I have seen several cases of tardy development of the power of speech in children who had, at three years of age, yet to cut the four last deciduous molares. An analogous case lately occurred in a niece of my own. These views lead to important practice in the treatment of stammering.

Anormal dentition and its consequences form our present subject. There are many other circumstances producing irritations to nerves, and consequently

operating as causes for the production of spasm, and of its various *forms* and *degrees*. Stammering sometimes exists as a part of the manifestation of a highly-nervous diathesis; but in many cases it is associated with a developmental error, and ceases when the erroneous trains have glided into those of harmony. I have known stammering commence at fourteen, and cease at eighteen years of age; and I have known it to begin at seven and cease at twenty-two.

The observation of cases illustrative of these positions has so often fallen to my lot, that I am by no means inclined to mention the coincidences with any degree of hesitation.

A gentleman called upon me to consult me about a sore-throat which had plagued him upon several occasions. I differed from all other medical men he had consulted. I held the opinion that it had no reference to syphilitic taint, but that it depended upon the same state of health as that which caused a very extensive decay of the double teeth in his mouth. The idea made him look at me as if I had said something very odd. I had not seen this gentleman for several years. When he called upon me before, he stammered a good deal: now he does



not stammer in the least. At one time he had so great an impediment, that, being in the army, his commanding officer was obliged to delegate the authority of giving the word of command to some other person. My patient was occasionally so great a stammerer as not to be able to perform this part of his duty.

I prescribed a course of remedies that effectually cured his sore-throat, and requested him to give me a note of his case, with reference to his teeth and the former impediment in his speech. He has been so obliging as to communicate to me as follows:—

“ At an early period of life, when seven or eight years old, living with my parents near Hammersmith, I was troubled with an incessant thirst, which induced me to drink large quantities of milk, water, and other liquids. My habit of body was at this time very spare, but I was very strong and active. My stomach did not seem affected by my indulgence in the habit I had acquired of taking large quantities of liquid, for I could, with apparently equal facility, digest any kind of food. At no period of my life could I bear a large quantity of spirituous liquors. That which would be moderate to most

men would to me be excessive, and occasion much uneasiness in the brain, and sickness in the stomach. About eleven years of age the desire for liquids began to subside, and in two years more I took less than most persons, and now, at nearly thirty, I take no other fluid into my stomach than a very moderate quantity of tea, morning and evening. The hesitation in my speech commenced when I was nine years of age: it increased till I was twelve, and gradually decreased until I was sixteen, when it left me apparently; but not entirely; for it occasionally shewed itself, and seemed to be influenced by, or rather to indicate, good or bad health. At twenty it became more frequent, and continued until I was twenty-three, since which time it has but seldom impeded my articulation. My teeth were large, regular, and well set, particularly in the front. I do not know how to account for the overlapping among them which is now observed. At the age of nineteen, decay began to shew itself in some of the double teeth of the under jaw; afterwards in the *same* teeth in the upper jaw; and this decay extended to several of the teeth in the upper jaw, attacking those immediately in the front. Then,

all the double teeth in the under jaw were also more or less affected by this decay; but all the front teeth in the lower jaw remained sound, and seemed not to sympathize with the decayed state of the front teeth in the upper jaw. I have observed that when I have been in tolerably good health my decayed teeth have given me no annoyance, but seemed firmly set, and were uninfluenced by contact with food; but if my health be impaired, all my teeth seem to sympathize with this state of body: those that are in any degree decayed become painful, and those not so seem to be influenced by an irritability which affects the whole mouth. In my late ill health I had ulceration about the gums as well as about the tonsils and fauces, and I had a very irritable sensation in the teeth. I am very sensible that an elasticity of body and mind, in thought and action, which I possessed, when I was some years younger, in a considerable degree, has now left me; but I feel, too, that if I be stimulated by my occupations into a train of thought that excites my mind, I have my old buoyancy in feeling and action. I have great labour in bringing the mind and body up to a working point; but if once engaged,

my health does not seem to influence either."

In this case the stammering commenced at an age when the teeth were developing; ceased to a certain extent before sixteen; recommenced during the period of the dentition of the wise teeth; and ceased completely when the pressure arising from their growth had destroyed not only themselves but many other teeth.

A boy, eleven years old, was brought to me by a poor woman who had the charge of him for several years. She said that for the last eight months he had become more and more dull and stupid, and had acquired a habit of stammering. His tongue was getting very foul, and his breath was very offensive; and he started and moaned in his sleep, and perspired a good deal at night. She thought something was going to happen to the boy. In looking into his mouth an extraordinary state of arrangement of the teeth was seen. The incisors of the lower jaw were so placed, that the edges of the two lateral teeth nearly touched each other, while the anterior incisors were placed back, one overlapping the other at an angle. The anterior bicuspid were pushed in; the pos-

terior bicuspid were not cut. The first molares were decayed, and behind them were two molares peeping through the gums. In the upper jaw there was more room, but the teeth were very crowded; and here the anterior bicuspid were both decayed; the posterior bicuspid were in their places; the first molares were decayed, and there was no appearance of second molares. The capsules of the canine teeth were prominent and turgid, but the teeth did not appear to be coming through. The boy in the course of three weeks had the six good-for-nothing teeth removed. I directed him to have alterative doses of blue pill, followed by senna tea every alternate day. In two months the boy's spirits and looks were quite altered, and he spoke without the slightest impediment.

The forms of spasmodic disorder are very various. May we not regard the sudden start during sleep as a spasmodic affection, differing certainly in *degree* and in duration from many spasms? What is the shivering or rigor of fever? May we not regard it as a miniature likeness of that general spasm we see in epilepsy?—a modified clonic spasm, modified by the existing condition of the patient?



Spasm accrues upon an irritation applied to nerves. These nerves may be derived from the surface of the body, and proceed through the brain to the internal structure of the intestines; or in the brain, or in their course, they may fall in with other nerves, with which they may associate themselves, going to perform their functions among other muscular organs of the body. Thus, *à priori*, who should say where a spasm would take place upon irritation applied to nerves supplying some of the villi of the skin? Associated as the fifth pair is with the great sympathetic, how shall we tell where a spasm shall light from irritation applied to a dental nerve?

A lady of dark complexion, robust in health, residing in my neighbourhood, sent for me to see her splendid beautiful boy, nine months of age. It had never before had a day's ill health since it was born. The aspect of the child's countenance was such, that one could be sure there was a strangulated gut. At my request Mr. Carter, who was attending, has been obliging enough to send me a note of this child's symptoms. "On June 16th, 1831, about eleven o'clock in the morning, the infant appeared unwell, heavy, and drowsy, and unwilling to

suck. The bowels had been opened in the course of the morning. On the right cheek there was an appearance of a sort of graze or mark, and the mother suspected that the nurse had let the infant fall; but the mark never manifested any further probability of such accident, nor were there any other appearances to shew that such had been the case. The child gradually grew worse, and I ordered it some castor oil. The bowels not being moved, a warm bath was directed, and one leech was applied to the belly. After using the bath a free quantity of blood passed from the bowels in the course of the night. No evacuation of faeces; but after this sanguineous discharge tenesmus came on, and progressively increasing in violence, frequently became exceedingly distressing, forcing away every now and then a free quantity of pure blood. The child had not cut a tooth; but I perceived the two lower incisors, and divided the gum and brought one through; but the child appearing to be in a hopeless state, the father would not allow me to divide the gum over the other tooth. This infant was ill about eighteen hours." When I arrived I found that Mr. Carter had exhausted the resources of our art; he left

nothing for me to suggest. On opening the body, the striking circumstance that presented itself was an intus-susception of at least seven inches of the ileum through the cæcum into the colon. The gut was quite strangulated.

The spasm productive of intus-susception is by no means rare just before death, in cases of cerebral irritation from anormal development, both in infancy and adult age.

What relation is there between a spasmodic affection and a diseased state of the skin? The revulsion of a cutaneous affection is very apt to be attended by convulsive spasms. Dr. Jenner well observed, that no pimple or breaking out ever attacked the face without giving relief to the brain. A disease of the skin may be as much a manifestation of irritated brain or nerves, as a spasm; but the disease of the skin may be an arrangement to afford relief to the nervous system; the spasm is a sign of irritation without relief. When the relief arrives in the form of secretion upon the skin, the spasm ceases. Cutaneous diseases afford occupation for the extreme blood-vessels. By a secretion on the free surface of the body, relief is afforded to the internal parts. A revulsed

eruption throws too abundant a duty upon the serous surfaces of the internal organs, and by a reflux of blood ends in an inflammation or a congestion of these parts. Such may be the termination of an eruption repelled, but it is not so necessarily. When the reflux of blood is upon the brain, the pressure irritates the nerves of the organ, and a spasmodic consequence may take place. But the conditions of all changes in the animal economy vary in *degree*. The change may be only to the amount of a blush upon some part of the brain, or perhaps the most minute increased secretion of the natural exudation upon the serous surface of the brain. This is not necessarily an inflammation, yet the change may proceed to an amount of irritation that shall be productive of spasm in that part of the body to which the nerve sends messengers. The brain may be in one of several very different conditions. Perhaps under one of these conditions the blush, or the effort at secretion, produces an inconvenience which is propagated over the brain. The message of such an inconvenience sent to the surface of the body is first a chill; the skin is corrugated; involuntarily the whole muscular apparatus moves slightly

in the form of a rigor. Perhaps the whole body shakes, the back having felt the sense of a pouring of cold water. The extreme nerves respond; the villous organization under their control suffers a change of state; the surface becomes hot, and an abundant secretion of sweat relieves the brain of its load. No illustrations of the varieties in *degree* of the manifestations of irritated nervous centre are afforded more striking than those which are exhibited in different individuals during the course of anormal dentition. Diseases originate from a great variety of circumstances, but we have hitherto been too apt in searching for distinctions, to define the extreme boundaries of symptoms, and hence the gradations of shades that exist as characteristics of species have not been attended to with sufficient minuteness. Among children, especially during the progress of dentition, we observe phenomena to which, but for their transient nature, we should apply titles that would place them in some important part of the nosological schemes. As it is, we endeavour to catch the flying discomfort, and call it ephemera or febricula. We do not, however, care for the flush that, during sleep, suffuses the

check of the infant, which has perhaps been preceded by a start. The little animal dreams ; we trouble ourselves no more about it. Its consequences may not have been serious, but it has nevertheless been a *degree* of spasm—a *degree* of fever. Growth has been proceeding ; some very trifling anormality has been present ; we have observed its result. Harmony, the *norma* of nature, is re-established ; the inconvenience is gone ; but had the anormality been greater, perhaps a serious consequence might have resulted. What is the disturbance in the course of the health of the infant that appears to be of the most trifling nature, and yet of sufficient importance to deserve a name ? Is it a febricula ? Writers in treating of infantile disorders, have the infantile fever, or infantile remittent fever, a *discomfort*, or a *disease*, according to circumstances—according to *degree*.

Whatever may be the infant's slightest ailment, convulsion is the severest ; it is the crowning disease—the termination to its worst fevers—the goal to which most of its ailments, unchecked in their career, may run. Dr. John Clarke (Commentaries, &c. pp. 84, 85), tells us that “ the symptoms indicating

the approach of convulsions are often overlooked by parents and nurses ; but upon an accurate inquiry made by a medical man, convulsions will most frequently be found to have been preceded by febrile symptoms, by drowsiness, by yawning, by sighing, by increased irritability, by impatience of sound and light, by some derangement of the process of digestion, or by some peculiarity of respiration." Dr. John Clarke has in a few touches painted the picture of the infantile remittent fever so accurately, and with such careful culling of authority described by Dr. Butter, in his treatise on the disease, What are its pathognomonic signs? All the ordinary conditions of fever belong to it. There are accelerated pulse, rigor, thirst, increased heat of skin, and perspiration ; moreover, the generic character of remissions and exacerbations. Are there specific symptoms purely distinctive? There is a spiritless fretfulness and discontent. The expression of the countenance tells us of this. Indolence is a characteristic ; a remarkable desire to pick, principally the nose—sometimes the lips and fingers—often even other objects ; the breath is offensive ; cough, or headache, or belly-ache, may be pre-

sent; sickness or faintness; sighing; starting, more particularly in sleep; moaning in sleep; grating the teeth; sleeping often with the eyes half-open; the bowels either relaxed or very costive. These are among the distinguishing signs.

In many cases the specific distinctive symptoms are present, but there is no fever attached to them—at least none that is remarked.

Is the malady *then* to be named infantile remittent *fever*? Dr. Butter (Treatise on Infantile Remittent Fever, p. 12) says, “the colour often changes.” Persons who labour under the distinctive signs that have been enumerated, without the presence of marked fever, often change colour; they take small parcels of the fever, without all the conditions essential to the febrile state. A cerebral irritation is sometimes evincèd without any thirst; a flush of countenance preceding slight rigor and paleness of face; then a slight headache may follow. The pupils of the eyes occasionally suddenly dilate—perhaps only one pupil—then as suddenly contract. Perspiration is a part of fever; this is sometimes observed night after night, succeeding to no very remarkable heat of skin, but to a great drowsiness, which in itself is a



proof of exacerbatation, though the accelerated pulse of fever may be wanting. The *moaning, picking, or starting*, with any of these conditions, constitutes part and parcel of the disorder. Sometimes the ailment is slight in degree, or it may assume an acute form, with all the fire and anger of a hot fever. Sometimes it is typhoid in its type. Whatever character may be assumed by this disorder, it is coincident with an irregular course of the development of some organ of the body; and commonly the irregular development is in the nutrient organs, and of these most commonly the teeth and jaws.

We have been considering the conditions that belong to a train of disease. Whatever may be the names which nosologists assign to parts of this train, the lowest grade is a discomfort—a start and a flush. Many symptoms intervene; the extreme is the convulsion, the termination of which is stiffness, or coma, and death. Cerebral irritation is manifested by the discomfort; and its *degrees*, as well as those of its manifestations, vary.

A disorder of the mucous surfaces of the alimentary canal is a form in which cerebral irritation sometimes manifests itself. Without apparent cause the sto-

maeh very suddenly voids its contents, and a flush of countenance, with very contracted pupil, and sudden acute headache, may supervene; perhaps not in every case. Frequent deep sighs; this state may not last long. A diarrhœa comes on; the stools are slimy. Now the remittent fever, with drowsiness, accelerated pulse, and all its other tokens, is present. If the child be of the weaning age when this cerebral irritation first manifests itself, the complaint is attributed to the ingesta solely; and it is said that they act by irritating the digestive organs, and inducing "a morbid state of liver."

How do they do this? We have no chain of events shewing the mode in which the ingesta may be a cause operating to produce a diseased liver in these cases. The liver may be found diseased after death, so may other organs; and most often so are other organs. But the liability to disease is first established in the system; and how is it established? Not immediately by the ingesta; for if this were so, every child brought up by hand should have the bowel complaint and the remittent fever. I have seen children brought up by hand that have never sucked their

mothers, in whom the vigour of constitution was such, that notwithstanding many unfavourable circumstances, the developments were very nearly normal, and no serious disease supervened during the whole progress of dentition. I have invariably witnessed some unpleasant circumstance relating to the power of digestion of the infant during the course of an anormal dentition. . One great practical benefit of the observations on the progress of development that I am endeavouring to communicate, arises from the distinction between subjects that are prone to be easily disturbed in the performance of their digestive functions, and those who, being of more healthy configurations, carry on digestion more steadily.

As a general rule it may be observed through life, that individuals who suffer from anormalities of dentition, and more especially those who mingle the developments of one septenary period with those of another, are persons who more or less, or sooner or later, according to the *degree* or the *period* of entanglement, feel the evil consequences resulting from imperfect power of digestion; and they are the persons who are most liable to epidemics, and most obnoxious

to the influence of those circumstances which are known to entail disease.

This general proposition has so often struck me in attending to the diseases of children, that I have been surprised to find it so much neglected in regarding the ailments of adult life.

The inference is not to be drawn, it is hoped, that improper food is beneficial to those children that are vigorously circumstanced by the enjoyment of a normal configuration. There are people who insist upon giving unnatural food to children long before their stomachs are prepared for any other description of aliment than that which the Almighty has furnished for the more tender period of infancy in the breasts of their mothers. Had the beneficent Being that formed us intended that pap and other poisonous compounds should constitute the food of infants, there is no doubt he would have supplied it ready made in the parental mamma. The desire to improve upon nature by silly conceits is in this respect, as in the wearing of stays and other badly applied articles of dress, undoubtedly the cause of great anomalies in the progress of growth. An exception to a general proposition is no proof of its incorrectness. If a child

thrives upon bad food, and if a woman retains her natural form after the application of twisting instruments worn as articles of dress, it can be said truly, that the constitutions of such individuals have been vigorous enough to withstand the evils inflicted upon them, not that those evils are the wisest arrangements they could adopt.

It is proposed then to refer the diarrhoea and atrophy which attack children about the weaning period of life, and which attack some sooner even than that time, not only to the improper ingesta that are crammed down the throats of infants by their mistaken nurses, but to a tendency that exists in the individual to have its digestion disturbed by the anormal progress of its developments. The atrophía ablactatorum, or weaning brash, so well described by my friend Dr. Cheyne, is, under this view, the disorder of the mucous surfaces of the alimentary canal, in which cerebral irritation sometimes manifests itself. It is by no means a disease confined to the weaning period of life; modified, often hardly at all, by circumstances, it occurs frequently in the progress of the second dentition. I have known the first four permanent molares cut, often without

the child or its friends having been at all aware that the process was going on; but I have in other cases seen the diarrhœa, atrophy, and all the signs of the weaning brash present while they were coming through. I have sometimes seen this disease present when the bicuspid and canine teeth were presenting themselves anormally. In the class of constitutions in which the frame proceeds with rapidity in its growth, the individual being of a very nervous temperament, this atrophy and diarrhœa occasionally attend on hasty, precocious, or irregular second dentition. In most of such cases the liver is the organ commonly blamed, and it has been fashionable to administer mercury, in some of its forms, with the view of regulating the secretion of bile. Does mercury act upon no other organ than the liver? May it not possibly influence the liver through its operation upon the nerves? May it not, by the medium of the central part of the nervous system, so "*loosen the texture*" of other parts as to facilitate the progress of development? In cases of anormal development, failing in this result, may it not fail too in promoting a healthy secretion of bile, and in arresting the progress of the disease?

Mercury acts very curiously in affecting the mouth during the progress of dentition, and often very beneficially; but injudiciously administered in this diarrhœa, it may aggravate the irritation upon the mucous surface of the intestines.

A very interesting and beautiful young lady, of slight figure, but tall stature, with light hair, grey eyes, and a very delicate skin, nineteen years of age, had been for nearly six months subject to night perspirations; for which her medical attendants, turning their attention to no other point in the case, had in vain prescribed sulphuric acid, Epsom salts, with infusion of roses, sulphate of iron, and acetate of lead. She received no benefit from this treatment; and as she became thinner, and had a hard dry cough, her mother took her into the country. She went into Kent, visited Dover, and remained out of town more than two months. Muttering, moaning, and starting during sleep, and grinding the teeth; picking her fingers almost all day, notwithstanding the soreness and pain she had induced, were indications of cerebral irritation in this case. The anxious mother, though her daughter

was rather better on the whole, could not stay away from London, for the bowels became relaxed. On their return to town, the young lady complained of constant headache; relieved occasionally by six grains of calomel. First one physician was consulted; soon after another was added. The pulse, at first 96, small and wiry, rose in a few days to 120; her health becoming rapidly worse, her emaciation extreme. The motions were at first like spinach, then they were like light greenish clay, with slime, and at last watery, with undigested aliment: whatever she swallowed seemed to pass undigested. Her tongue, at first like raspberries and cream, a white ground with red spots upon it, became dark and loaded. The edges of her mouth were black, and she died comatose at the end of nearly seven weeks. Her medicines had consisted principally of chalk, Dover's powder, ipecacuanha, rhubarb, kino, preparations of mercury, &c. In the latter periods of her illness it was observed that mercury appeared to aggravate the bowel complaint. On examination of the body the head was not opened. The lungs were partially hepatized, and there were a few small



tubercles. A small quantity of fluid in the pleural cavities, and some in the pericardium. Pleura costalis and pulmonalis adherent for a small space at the left side. Liver small; gall-bladder empty. Inner surface of stomach sodden and soft. A patch of denuded surface of the size of a sixpence near the cardiac orifice. Peritoneum of jejunum and ileum inflamed in patches. One portion of the gut, for about three inches, *intussuscepted*. Ulceration in patches about the agminated glands. A few mesenteric glands hard; some large, containing cephalomatous matter. Caput cæcum thrust up near the stomach. Arch of colon contracted. In the mouth, the first molaris of the left side in the lower jaw was gone; the corresponding tooth on the right side was decayed. The teeth in the upper jaw were complete. The first molaris on each side had the blue colour that indicates incipient decay. The two upper wise teeth were through the gums, the lower had not protruded.

A fine healthy-looking child, the object of general admiration for its remarkable beauty, had been partly nourished from the breast of his mother and partly fed through the sucking-bottle,

on a mixture of tops and bottoms with milk. He appeared to thrive well. At eight months of age, the two inferior central incisors were cut at the same time. A diarrhœa attended this development, and he was somewhat reduced in flesh. His mother became alarmed, and took him into the country, about thirteen miles from London. Three weeks after the appearance of the two teeth, the diarrhœa returned with aggravated symptoms. Drowsiness, moaning, starting, waking up to cry, to rub and pick the nose; an occasional expression of wonderfully increased intelligence; then a discontented, peevish look; extreme fretfulness; screams; breath faint, and offensive; thirst very great; skin hot and dry; evacuations watery, curdy, faint in odour, very frequent; aliment undigested. This state continued three weeks, not materially influenced for the better by the medicines that were administered, which consisted of chalk, calomel, laudanum, and starch clysters. The emaciation was extreme. The parents of the child had the advice of some of the most distinguished and talented medical men in London. It was observed that calomel aggravated the diarrhœa, and the infant was generally

worse after its exhibition. Mercury, with chalk, did not produce more favourable results. Anasarca came on, and in six days after the first appearance of œdema the child died.

During seven days, this infant had cut four superior incisor, two lateral inferior incisor teeth, one superior and one inferior molaris of the right side, and the capsules of those on the left side were advanced.

In this atrophy, with diarrhœa, coincident with dentition, the digestive functions are for the most part so seriously impaired, that whatever is retained without being vomited passes speedily through the alimentary canal, unaltered in character: potatoes especially, and most vegetable materials, go through unchanged. The fever accompanying the disease is the same which has been described by Dr. Butter, as the low infantile remittent fever, though it is modified by circumstances. It varies much in its energy, and sometimes has a close analogy in symptoms to the severer forms of typhus, but generally it lasts much longer. There is an erroneous course of development: if evolution be favoured by circumstances, the patient recovers. A little girl, eleven

years of age, had shed her incisor and canine teeth; the four deciduous molares were persistent and firm in her lower jaw. She had lost the first deciduous molaris of the right side in the upper jaw, and it had been replaced by a bicuspid tooth. The bicuspid on the other side had come through a wrong part of the roof of the mouth, while the molares, which ought to have loosened, were in their original places. Her canine teeth projected forward. There was no room behind for four more teeth. The errors of health in this girl consisted at first of a roughness all over her skin. She had cough, and her mother remarked that the child had had the same kind of cough in cutting each tooth while an infant. She sucked her thumb all night in bed, and occasionally moaned, muttered, and started in her sleep; dreamed a good deal, and sometimes awoke crying and screaming. The father had tried to cure the child of sucking her thumb by the adoption of various expedients. On one occasion he tied her two arms down to her side after she had fallen asleep: a convulsive fit ensued, which lasted nearly two hours; and since that, no attempt had been made to break the habit.

For about a week, the girl had had a relaxed state of bowels, attended with rapid emaciation; six or seven green slimy motions in a day. Breath very offensive; pulse 110, wiry; tongue raspberry and cream; great thirst; no pain about the stomach. Calomel, six grains. Three deciduous molares of the upper jaw removed. Next day (October 8, 1832) three dark motions; last very slimy, with forcing pain. Chalk mixture; two drachms of comp. tinct. of camphor; aromatic confection, to be taken. At night, rhubarb, ten grains; syrup of ginger, two drachms; cinnamon water, fourteen drachms.

9th.—The rhubarb operated at four. Forcing pains. Two other motions, of light clay colour. Four molares of lower jaw extracted; fangs of the anterior teeth beginning to be absorbed. Calomel, three grains, and extract of opium, one grain, were prescribed; but the girl feeling quite well, the medicine was omitted.

A girl, aged twenty-one, a servant-of-all-work, was obliged to leave her place in consequence of a bowel complaint, for which she had in vain swallowed doctors' stuff. She applied one morning to me: it was with difficulty she could

be brought to my house, so weak and emaciated had she become in the space of four weeks. Her countenance was pale and anxious. She had sandy brown hair, and grey eyes. There were a great number of small warts on her forehead, and a few on her hands. Her face was uncommonly greasy, and had numerous small elongated sebaceous follicles about it. The tongue was a marked example of the raspberry and cream character, so common in cases where the teeth are developing. In the upper jaw this girl had all her teeth perfect; in the lower jaw there was *overlapping of incisors*. The first bicuspid on each side was pushed into the mouth, towards the tongue. She had been obliged to have the first molaris on the left side removed about six weeks before, from its having been decayed and painful. The corresponding molaris on the other side was quite decayed. The spaces for the two *dentes sapientiæ* were abundantly large, but covered by dense cartilaginous substance, through which the teeth could not issue. I removed portions of this chondroma, and prescribed of rhubarb one scruple, sulphate of potass two scruples, tartarized antimony one grain, compound powder of

cinnamon, six grains\*, and desired the mother to let me know how her daughter was the next day. She did not come; but two months afterwards she wanted advice for herself, and I had the gratification of learning that the daughter got quite well a few days after I saw her, and was now in place again.

Dr. Butter, describing the infantile remittent fever (p. 13), says, the "belly is on the extreme, being either costive or loose." He had no idea that he was describing the same diseased condition of body as that to which Dr. Cheyne has affixed the title of *atrophia ablactorum*; which, in fact, is but an aggravated *degree* of a *symptom* of the developmental disorder.

It has been remarked that cerebral irritation manifests itself by a disorder of the mucous surface of the intestines. Is diarrhœa to be considered as the only manifestation of a disordered mucous surface? May not the absence of a healthy degree of sensibility to the impressions of the substances which come in contact with it, be considered quite as

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\* An excellent formula by Mr. R. S. Eyles, of St. Andrew's Court, whose talents as a practical physician are equalled only by his affectionate disposition as a friend.

much a disordered condition as that in which too keen a degree of sensibility characterizes this texture? Very often the bowels are costive, and though this is not so inconvenient as a state of diarrhœa, it cannot be said to constitute a healthy condition of the canal. When the degree of ailment is not at first very striking—when an anormal development is attended by starting, moaning, and muttering in sleep, and a costive state of bowels, an occasional flush, an occasional sick headache—if no other symptom be present, very little is thought of the disorder. The costiveness becomes a habit. It is not a habit of perfect health; yet how common is the observation that such a person is very healthy and strong—his *habit* is costive: and then, among some, follows the inference that a costive habit is the cause of strength;—and if the individual was an example of anormally developed structure, he might be adduced as a convincing proof of the fallacy of any general proposition which assumed that normal health and anormal dentition were incompatible events. To argue in a controversial spirit is not the purpose of the present observations. Objections cannot be made to correct statements.



The position adduced may not be clearly or explicitly stated, and objectors may not understand what is meant; and hence misapprehensions occur. There is a proneness in some individuals to prefer a mistaken view to a correct one. *Perfect health* surely is not a state in which any circumstance in the frame produces a *tendency* to either an acute or a chronic disease. This *tendency* must accompany costiveness. When a constipated state of bowels is present, with the signs of the developmental disorder, several unfavourable events are apt to supervene: the mucous surface of a costive bowel can be irritated, and can propagate the irritation to the brain, as well as the inner membrane of a relaxed bowel; but the result must be as different as the conditions. The mucous surface of the intestines is but a part of the dermoid system. The mucous surfaces in other parts of the body belong to the same system, and the influence of these parts upon the nervous system varies according to the condition in which they may be. Thus if, during a costive state of the bowels, the wise teeth are cutting anormally, a delirium may occur, carrying off the phrensied patient in seven days. On examination of the body, the

remarkable healthy state of all the organs except one, the inflamed mucous surface of the bladder, and consequent thickening of its muscular tunics, might be striking. Could such a case occur in a very relaxed state of the bowels? Constipation, coincident with an anormal state of the development of any organ, is surely to be guarded against. A gentleman, twenty-seven years of age, was occasionally affected with *tic douloureux* of the left cheek and eye-lid. He applied to me to know what were the best means of avoiding the habit of constipation; for he had observed, that during the last five years he had always been relieved from pain when he took calomel and colocynth, and got a complete clearance of his bowels; but he could not, he said, be always taking calomel, and had therefore tried rhubarb and lenitive electuary, and senna with prunes, and salts and castor oil: but to be obliged to be always taking medicine was a great evil. The apparatus for enema was not effectual in his case; it had no satisfactory result; it did him no good. I asked him if he were aware that one side of his face was developed in a very undue proportion to the other? To his knowledge, nobody

had remarked it. In looking into the mouth, I found the wise teeth of the upper and lower jaw completely through on the right side; on the left, one tubercle was peeping through the gum in the upper jaw, and in the lower there was a swollen gum, but the tooth was not through. I remarked, that in all probability liberating the teeth by means of the gum lancet would render the use of medicine unnecessary; but as he felt very sceptical upon what he seemed to think a novel idea, he would not submit. I gave him a prescription for equal parts of the extracts of rhubarb and jalap, which I have found a good habitual eccoprotic, and told him to take every night as many pills as he found, from experience, necessary to keep the bowels open; remarking to him, in order to meet his prejudice against habitual medicine, that I thought vegetable extracts, which acted gently upon the bowels daily, in cases of constipation, with irregular development of some part of the frame, were as little prejudicial, provided they did not produce piles, or other injurious condition of bowels, as any other form of vegetable matter, which some folks thought it a duty to take at dinner, for

the purpose of keeping the bowels regular. Under this view, I warned him against colocynth, aloes, gamboge, Morison's and other quack pills, which, habitually taken, are so apt to induce the most inconvenient forms of piles, fistulæ, and contracted gut. Living so artificially as we do in society, it is curious that more minute distinctions regarding the influence of medicines upon particular parts of the alimentary canal, have not been popularly established, and that more strict investigation has not been made into the conditions under which the milder forms of mercury become beneficial adjuncts to the gentle purgatives that are in common use in families. A little more extended information given to the public on these subjects, would destroy the greater part of the mischief they entail upon themselves by the ignorant patronage they afford to the vendors of drastic purgative pills. The subject of costiveness, and of regular peristaltic action, is intimately linked with that of anormal development of the teeth and jaws; and the numerous diseases that may be traced to a sluggish state of the alimentary canal produced into a habit, though first generated by anormal growth, form a very curious

subject of inquiry. Children who are the subjects of convulsions, or who are prone to any of the symptoms of the developmental disorder, or to any degrees, not absolutely trivial, of those symptoms, are, for the most part, liable to a confined state of bowels. The growth being anormal, if a costive condition of alimentary canal be an accompaniment of such error, a habit is acquired; the mucous membrane is not duly influenced by the contact of the ingesta, and a healthy consentaneous *normal* peristaltic train of action does not take place in the gut. The individual retains a costive habit for life, perhaps. How much of the healthy state of liver, and the quantity and colour of the secretion of bile, depend upon a healthy state of the intestines, is a question not sufficiently investigated. In medicine, it is not always easy to establish the words which ought to follow *propter*, but we may be assured that observation leads to the conclusion, that where costiveness is *coincident* with anormal dentition, the secretion of bile is very apt to be in one of two different conditions—that of deficiency, with clay or greenish colour, or that of redundancy, with dark colour. In either case, maga-

zines of dark bile may be found hoarded in the gall-bladder, hepatic, and even in the smaller biliary ducts, unless a sufficient quantity of mercury has been given to remove these lodgments.

It is not in children alone that convulsions happen in coincidence with anormal dentition and costiveness. Tie may be considered to be nearly allied to spasms. Spasm of the part affected with the pain not unfrequently accompanies the disease, and both are often removed by unloading the mucous surfaces of the bowels of their irritating contents. The disease recurs. There is surely some other circumstance productive of its presence, for sometimes the aperient medicines, even in the same individual, do not remove the complaint. We are considering anormal dentition and its concomitants. If anormal dentition be present in such a case, the ingenuity of the medical attendant should be exerted to discover the precise anormality in the train of growth, and if it be curable, it ought to be put into a train of regulation. But very often, when we discover the precise anormality, we are at a loss to know how to obviate its tendencies;—how to put the individual into a condition to promote the growth which is proceeding.

A man, twenty-two years of age, by trade a shoemaker, above the middle height, with brown hair and grey eyes, waxy and greasy countenance, bilious conjunctiva, applied to me for advice, suffering, as he was, from pains on the left side of his face, which were sometimes attended by spasmodic twitchings, that invariably aggravated his *tic douloureux*. He was of a very costive habit of body, and could easily go a week without visiting the water-closet; nor was he aware that he was at all worse for being a few days without a stool. The complaint was whimsical; sometimes it came on severely, and then it left him for a fortnight or three weeks; then it would visit him slightly; then it would go off again, and he never knew when he was to have a slight or a severe attack of pain and twitching. He could not find out if any particular kind of weather made him better or worse. In speaking, he stammered very much; and he said he knew of no circumstance to account for his impediment. About two years before, he had suddenly become very nervous, and he then began to perspire profusely at night. His night-sweats still continued, but they were not near so bad as they used to be.

When his nervousness came on first, he began to stammer, and he was sometimes so confused for a word, that it seemed as if he had been stunned, and had forgotten every thing. In his sleep he often started and moaned. This had been remarked by others, or he would have known nothing of it himself. He was very subject to cold in the head, and coughs. The pulse was seventy-two, wiry, and quick in beat; the tongue was loaded at the back part with a yellow crust; the jaws were small, and he had only twenty-eight teeth; the four last molares were wanting: the spaces for them were very small. In the upper jaw the tubercles were prominent, behind the second molares; in the lower jaw there was not room for the *dentes sapientiæ*. The first molar teeth had each specks in them, and were of a more blue tint than the others. With a conviction on my mind that this man was suffering from a retarded and an obstructed development, I knew not how to afford him relief. If that part of each jaw which contained the germs of the wise teeth could grow faster, there would be room for the teeth to come through; but how was the tendency to growth to be given to him? Going into the coun-



try, where a pure air would invigorate him, and make him expand his frame, was out of the question. To give him iron, bark, and other corroborants, in town, would do little good, but, combined with an eccoprotic and alterative course, it was the only plan left; for, to remove the four healthy teeth, which prevented the egress of the wise teeth, was an unwarrantable experiment. First, he was advised to take alterative doses of blue pill, with extract of colocynth. This cleared his tongue, and I thought made him stammer less; but he assured me that the stammering varied: sometimes it was better, sometimes worse. Every morning he was enjoined to take a solution of a small dose of the sulphates of potash, soda, and magnesia, in a large quantity of water; and an hour before dinner, regularly, two grains of sulphate of quinine and one of ipecacuanha; porter at dinner, and Dantzic spruce at bed-time. This man came backwards and forwards to me for several months. I varied his medicine: I gave him colchicum with rhubarb; directed him to sponge his body with warm vinegar. Nothing relieved him; and I lost sight of him for fifteen months. He had been in the neighbour-

hood of Birmingham, with some relations: he had gained flesh and looked more healthy, and had lost the tic and the twitchings. The jaw had increased, and he had cut the upper wisdom teeth, but the lower were not through: there was still too small a space. He had suffered much from decayed teeth, and had had three drawn, and there were four decayed teeth and a stump still remaining. The pressure from behind, in the lower jaw, had wrought a remarkable change in the incisor teeth. When I first saw them, they were even; now they were huddled together, and lapped over one another.

I proposed to this man, by way of curing the habit of stammering, that he should lose the remainder of his decayed teeth, and have the gums over the new-coming wise teeth freely scored. He would not take my advice, and I saw no more of him. Nature had in this case made greater havoc with the teeth than I should have done, had I not regarded the removal of four healthy teeth as an experiment I had no right to make.

What is the process that usually induces decay of the teeth? The first step is the pressure in the progress of growth upon the fangs of the teeth. This

is, occasionally, so great, that the fangs are directed from behind forwards, or very much bent outwards, and compressed together. Sometimes an obliteration of the canal, which admits of the passage of the nerve and blood-vessels of the pulp, takes place; but even without this obliteration, the continued pressure of growth is sufficient to produce a disease of the pulp. This part having once suffered irreparable injury, the tooth dies, excepting, perhaps, that part of it which retains some vitality from the nourishment afforded to it through the medium of the membrane which some call the *dental periosteum*. When the crown of the tooth dies, its colour changes. A spot, perhaps, is found in some part of its external surface, which is apt to extend itself; but even if it should not, the enamel is so brittle that it breaks down like glass, and exposes the remains of the pulp denuded of its ivory, which suffers before the enamel had become so brittle. There are several diseases which affect the internal structure of the tooth; some attended by considerable inflammation and pain, others by a mere wasting of substance. The causes productive of the various diseases, regarded distinct from each

other, should occupy the attention of the dentist: our object at present is, to trace merely the influence of growth upon these organs when that growth is anormal, and to show that decay of the teeth, as it is called, is a process resulting from a law of development operating in anormal trains. Sometimes there is great disproportion between the size of the teeth and that of the jaws, the teeth being much larger than they should be for the space allowed for their occupation. Hence, in the course of years, a continued pressure is apt to produce the diminution in size, or the obliteration of the nerve and blood-vessels. I have seen the second large molaris, influenced by some law the direction of which has yet to be investigated, so much jammed by the growth of the wise tooth behind it in a girl of fifteen, that one fang and its nerve and blood-vessels were unusually developed towards the outer part of the jaw, while two fangs, situated posteriorly, were compressed into one, their points directed forwards, and their cavities, as well as the nerves and blood-vessels passing through them, were nearly obliterated. These organizations, in order to understand their changes, should be regarded in reference to the

slowness of their progress. The misus of growth rushes to a portion, perhaps, only of the jaw; a deposition of bone takes place between two fangs: this may widen their distance from each other. If, on the other hand, a determination exists to form an increase or deposition of hard jaw-bone of an unusual size behind the tooth or on its internal side, the operation of this growth is a continued pressure, in some cases for years, and the result is a curvature forwards or outwards of the fangs of the tooth. In such cases, the fangs are compressed together. Sometimes the change, coincident with the development of a wise tooth, proceeds without much addition to the growth of the jaw. A wise tooth is sometimes lodged in the coronoid process of the lower jaw. It is developed there often without much increase in the size of the jaw, and I have in one case seen the two inferior wise teeth grow in a direction almost perfectly horizontal.

In some cases, the vigour of the organs formative of the tooth is more than proportionate to the vigour of growth of the jaw, and the result is that the fangs, spreading more extensively than they should do, compress the maxillary nerve,

and inconvenience follows, according to the degree or extent of irritation produced. In cases where the full complement of the teeth is not perfect at the normal periods, there can be no doubt of frequent want of harmony; but with some a doubt may arise as to the existence of such a state where all the teeth have been cut. Whether the fang of the tooth grows, or the bony structure of the jaw suffers diminution by a gradual morbid contraction, the result is the same.

The teeth, especially the incisors and bicusps, become huddled together, and an overlapping in front of the mouth takes place, one tooth riding upon another; and this disordered growth is always attended with some constitutional inconvenience. It is true the inconvenience may, in some individuals, be of a trifling nature, but in others it may extend to a very serious disturbance of functions. The *degree* of inconvenience varies according to the susceptibility of the party. The feelings of some persons are much more keen than those of others, and it is occasionally found that the depressing passions in such cases are attended by pain or other physical inconvenience.

Those physicians who are led by the line of their practice to treat the ailments of women, should be aware of the fact that anxiety or grief is apt sometimes to be attended by irritation in the neck of the womb, and a discharge of muco-albuminous matter, accompanied by pain in the back and some prolapsus. This condition I have seen concomitant with pain in the fauces, extending to the roof of the mouth and round the alveolar arch. In other cases, grief and anxiety are attended by a marked expression of countenance, a tightly-closed jaw, and pain in the fauces, nostrils, and around the teeth.

A highly-respectable and worthy person having been observed by me to evince very keen feeling, though his good principles enabled him to command them to a certain extent, was requested to supply me with a note of his case; and as it is illustrative of the point under discussion, he has been obliging enough to allow me to subjoin it. He says, "From my childhood I have been what is commonly called a nervous subject; and when about fifteen years old, suffered severely with headache. Up to twenty-two years, I was of a very confined habit of body;

at which time, changing my residence from the east of London to west, the state of my bowels suddenly changed, and I suffered severely from diarrhœa, which continued, more or less, for three years. I then married, and being more settled, found myself better; but at the end of a year, some circumstances occurring that caused much anxiety of mind, the diarrhœa returned in an aggravated form, and I consulted several of the faculty without effect. At length it abated, but ever since (a period of more than twenty years) I have been much troubled with my bowels, which never act sufficiently without the aid of medicine. At about thirty-nine, I had a sudden attack of pain in my left temple, which I believe to be *tic douloureux*. I suffered dreadfully for a fortnight, when the pain subsided. I continue to have attacks at uncertain intervals, more particularly if my mind be much disturbed. This complaint will sometimes yield to medicine, but the best remedy I find is a blister, which I have sometimes kept open for three weeks; but from my nerves having been latterly much shaken, I cannot bear the irritation of this remedy now for so long a period.



“ At forty-two years of age, being under great anxiety of mind, in consequence of my son's dangerous illness, I found that my teeth in the lower jaw were so tender (as I at first supposed from cold), that I could not bear to brush them as usual; and my distress of mind increasing, I became conscious of a change in the shape of the jaw, which contracted so much that the front teeth, which before were almost even, lapped over each other. Mentioning this to a medical gentleman, I got laughed at for my pains; but being perfectly convinced of the fact, I have carefully watched the state of my teeth, and invariably find, that whenever my mind is disturbed by any unexpected circumstance, they suffer also, either by lapping more, or becoming more tender. On one occasion I suspected a decayed tooth, for I suffered great pain; and I consulted a dentist, who assured me that the tooth was sound. After a few days I had paralysis of the right half of the lower lip, which continued for about a month. I am at this time, being forty-five years old, suffering from tenderness in my lower teeth, which I attribute to grief at the expected fatal termination of a daughter's illness, who has been

confined to bed seven months, during the whole of which time the use of a tooth-brush has caused me great pain."

Mr. Bell, in his work on the Teeth, treating of constitutional neuralgia, says (p. 315), "It appears that no cause operates more frequently in producing, or at least in increasing the disease, than any violent mental agitation or long-continued anxiety. Numerous cases have come under my notice, the origin of which could be traced to the loss of near friends and relatives, a sudden reverse of fortune, disappointment of long-cherished and ardent hopes, and similar causes of mental depression; and in almost all cases, such circumstances occurring during an interval of relief, or even after the disease has been apparently cured, will be likely to occasion its return." It is well that the observation of these coincidences has been noted by so scientific a writer.

The costive state of the alimentary canal is for the most part concomitant with neuralgia as it is with spasm. It has already been remarked, that children who suffer from convulsions, or from any *degree* of them in the form of spasm, or indeed from most of the parts of the developmental disorder, are *gene-*

rally liable to a confined state of the bowels. A boy three years and a month old had only just completed his dentition of twenty teeth; he was an uncommonly fair child, with light hair. During the course of his dentition he had upon several occasions suffered from fever, and breaking out about his mouth and behind his ears. Latterly he had been very costive; and if his mother neglected to give him some medicine, he went four days without a stool, a circumstance that alarmed her much, for it was attended with fretfulness and overpowering sleep. He started in his sleep; and he occasionally snored very loudly—"unnaturally," as she expressed it. A dose of castor oil, or of senna tea, produced a large seybulous motion, and the boy obtained relief, and became lively and playful. He was one day seized with a fit, fell down, foamed at the mouth, and gnashed his teeth; he threw himself about so much, that she thought he must be much hurt, and she tried to hold him, but he was too strong for her; she had no power over him; she lifted him on a bed as well as she could, with the assistance of a neighbour, and in less than a quarter of an hour he was "snoring asleep like." She gave him castor oil

as soon as she could, and he was quite relieved in four hours. The phenomena were here evidently connected with a costive condition. Was that costiveness in any way connected with a state of brain influenced by the irregular and tardy development of the teeth? There was no room at the back of the boy's mouth for any more teeth, nor did there seem to be the usual spaces indicative of a preparation which is gradually made for the coming up of the first permanent molares. Were the capsules of these molares unduly pressed upon? If the last teeth had not been very good, I should have proposed their removal; as it was, I recommended senna and prunes, and milk of sulphur, to be taken alternately at bed-time; and with a view of invigorating the frame and encouraging development, a residence, if possible, in the country.

Costiveness may be idiopathic. The intestine itself may be in a sluggish state, the villous surface having been developed with an anormal want of its due share of nerve; but there is generally a coincident error of some other part of the dermoid system. In some constitutions there is, if the jaws and teeth be not consentaneously developed,

a costive state of bowels, with a tendency to relieve the mucous surfaces of the consequences of their apathy, by the establishment of an irritation upon the skin. I have seldom seen a case of urticaria without having been able to trace some connexion between the complaint of the skin, and an anormal development of the teeth and jaws. The subjects of urticaria are most frequently persons of a costive habit of body, and commonly freely moved by magnesia taken as an aperient—the presence of acidity, or the passage of acrid bile, being the most usual antecedent of the urticarious eruption. I requested a gentleman to give me, in answer to some queries, a note of the symptoms which he had detailed to me in consultation; and with his permission I append it. This gentleman is 32 years of age, of a nervous and bilious temperament, with dark hair and eyes. He has lost his second bicuspid in the upper jaw, and has all his other teeth except the four last molares, for which he has not room in the jaw.

“ I cannot,” he says, “ remember the time when I was not occasionally teased with nettle rash; but I never heard, till you told me, that the complaint had any

thing to do with my teeth and jaws. When I was a boy my nose used to bleed very often, and the key of the house-door put down my back generally stopped it. I remember upon one occasion it bled in a copious stream, and I lost about a pint in a few minutes. I was in the habit of picking my nose; it used to itch; and the desire to relieve it by putting my finger into the right nostril was irresistible, and this brought on the bleeding. It was an observation of my mother's, that my nose bled if I was for a few days free from my nettle rash. Sometimes the eruption kept me awake in a feverish state all night. I used to take calomel often, and rhubarb and magnesia. I do not remember what did me most good in this complaint when I was young; certainly I find your soda and mercury alterative lozenge, and magnesia, are the medicines which relieve me most speedily. In reply to your question about moaning in my sleep, I may mention a circumstance that I remember well. When I was ten years old I went on a visit into Norfolk, and slept in the next room to an old gentleman, who was considerably annoyed by hearing me moan in the night; and he came several times every night

to awake me, as much for my sake—for he thought I must be in great distress—as for his own. I used to start in my sleep very often; and I always perspire a good deal in the night. At seventeen it was thought I was going into a consumption; I had very severe headaches, a hollow cough, constant starting at night, and heavy perspirations. Every body was very kind to me; and I could not help feeling low that I was an object of so much compassion. At this time I have understood that my breath was so offensive that people did not like to sit in the same room with me. I could not read, or apply my mind to any occupation that required thought. Study made my eyes and my head ache severely, and produced a feeling of sickness and grief which was intolerable. The most comfortable condition in which I could place myself, was huddling up under a cloak upon some chairs, for I was often very chilly, and my headache and shiver were relieved by sleep. About my bowels, all I can say is, that they were invariably costive. I used often to go eight or nine days without a visit to the temple. I have had at different times many ideas about the kinds of food that brought on my nettle rash.

Vinegar and all acids produce it. I am very fond of pickles, but dare not eat them. Wine of all kinds used to bring on my wheals and itching. I do not think it does now. Shrimps have brought them on. I never tasted muscles, so I cannot answer; but I never observed that periwinkles, or cockles, or oysters, did me any harm. I have no great fancy for vegetables; I prefer meat; and most frequently eat it without any thing but bread. The habit of tearing my finger nails I have had for years; and I have always had a great desire to pick the little hard inequalities out of bad paper. Many a time I have grieved at having injured a borrowed book, by unconsciously picking a hole in it in tearing out a little lump from the paper. The temptation was irresistible."

A curious circumstance relating to the accession of attacks of urticaria, purpura, and some other diseases of the skin, is, that they are often attended by one of two states of nervous system:—some degree, however *slight*, of mental clearness or excitement; or a sense of debility, somewhat analogous to that which succeeds loss of blood. In anormal dentition, the accession of the *nisus*



of development appears always to be attended with some additional energy of morbid action in a disease of the skin which may happen to be coincident with it. This observation may easily be verified by an attention to the eruptions to which children are liable during dentition. Warts itch and are troublesome on the fingers of boys who happen to be under the influence of the *nisus*. In general, if a lad have *porrigo scutellata*, and any circumstance tends to excite his mind, it may be observed that the surface of the head is troublesome to him—not always perhaps. A person who stammers, if the fault is connected with abnormal dentition, will at times find himself much more nervous than at others. A gentleman cutting wise teeth found that a horny scab under the angle of his lower jaw troubled him by itching intolerably, for three months before he cut a tooth. When the process was complete, the scab vanished.

An argument is very often made use of against my views, under the idea that it is a final objection, as well as a fatal blow. Those who oppose unphilosophically and controversially the search after truth, may remain satisfied that they have every thing

their own way. Positions I have never advocated have, by these weak people, been put into my mouth. It has been said, "these inconveniences *asserted* to be coincident with some conditions of anormal developments of the teeth and jaws, cannot possibly have any connexion with them, since, if they had, they would be always in the same state, whereas we know that many persons who stammer experience the impediment from causes which can have nothing to do with the teeth."

Controversialists, without being aware of it, often talk great nonsense. Stammering is sometimes better, sometimes worse; sometimes linked with anormal development, sometimes not. Occasionally, like a permanent squint, like permanent blindness, like permanent deafness, it has commenced in alliance with an anormal condition of some development, and habit has fixed it incurably, or the "*temporary derangement of organization*" has become permanent. One or another particular train of events is not necessarily continuous; it may suddenly appear, and as suddenly cease. A person subject to epilepsy is not always in fits. In most cases where the process preparatory to cutting the

wise teeth goes on for years, the effort at development is repeatedly made, and subsides again. Perhaps there is no room in the jaws for the teeth to come through into their places. Gradually an increase of growth takes place. The pressure of the developing tooth, or of the neighbouring jaw-bone, may operate in destroying the pulp of the tooth next before it. Perhaps the first molaris may be so situated in respect of its nerve and blood-vessels, that it is the first to suffer. Its decay, especially if the corresponding tooth on the other side decays, arrests most frequently the fits of irritation to which the cutaneous disease was liable, provided space be afforded by this circumstance for the expansion of the jaw. How is it that, where complaints of the skin are vicarious with hemicrania, or with sick headache, these mischiefs vanish upon the re-establishment of the cutaneous disease; and if they be coincident with the anormal progress of development, they all vanish together when trains of harmony and perfection are restored? In a case of obstinate headache that would yield to no medicine, I had an issue inserted in the left arm. The man was a tailor, and a very highly nervous

subject. The drain relieved him effectually. At the end of eight months erysipelas attacked his arm, and his life was in danger. The issue was poulticed till it healed. Soon the headaches returned, and were again relieved by producing the eruption on the arm and thigh alternately, which the friction of tartar emetic ointment produces. I lost sight of this man, who was an object of interest to me, for at nine and twenty he had no room in his mouth for his four wise teeth, of which I was anxious to watch the cutting.

Cerebral irritation may manifest itself by either of the two opposite conditions of mucous surface, diarrhœa or costiveness; and it may be partially or very greatly relieved by the establishment of an irritation on the skin, which is more or less productive of the presence of a secreted fluid. The developmental disorder, or infantile remittent fever, or degree of hydrocephalus, has thus far been analyzed in relation to some of its signs. In showing that it exists in some of its parts in those constitutions in which a normal development has not taken place, in connexion with some diseased conditions of skin, we trace its history through years, and learn the intimate

coincidence that exists between disordered states of dentition, of mucous surfaces, and of external covering of the body. It would be very easy to detail numerous cases that have fallen under my observation, to bear out the positions I am endeavouring to establish. The desire not to be too diffuse restrains my illustrations; and some of them are necessarily checked, from the complications that attend them, since they would drag on the consideration of questions divergent from a logical train of propositions. Thus, in considering costiveness as a part of the developmental disorder, occurring in a case of urticaria, we are compelled to enter into considerations out of their place, to exhibit the relation of this diseased condition of the skin with anormal dentition. In quite a contrary state of alimentary canal, coincident, too, with anormal dentition, one of diarrhœa, accompanied by atrophy, I have remarked the existence of molluscous tumors of the head, face, and neck. I have had several cases in which warts about the forehead and fingers accompanied anormal dentition and developmental disorder. A lady called upon me one morning, to consult me about her own health. As she was going away,

she asked what was good for warts: her son, nine years of age, had his fingers covered with them. He was a healthy boy, but backward in shedding his teeth. She had left him in the carriage, and I requested to see him. I found a boy rather tall for his age, with a pale, waxy, and very greasy countenance; his tongue had the raspberry-and-cream character. He had a very costive habit of body. Upon inquiry, I found he had several of the distinctive signs of the remitten disorder; but as nobody had taken particular notice that he started and perspired at night, and had very often, after doing his school exercises, a flushed face and a sick headache, it was concluded that he was a healthy boy. He had shed four incisors in the upper jaw, which were replaced; two central incisors in the lower jaw were growing up; the two lateral inferior incisors were persistent. All the deciduous molars were decayed, and the first permanent molars were yellow imperfectly-formed teeth. I told the mother that a dentist could cure the warts by putting the mouth to rights: that I had frequently seen warts on the hands, which had vanished when the development of the teeth had become complete.

A young woman, aged nineteen, of a fair complexion, tall, and of lymphatic embonpoint, the servant of a patient, was sent to me lately for an opinion upon a phlegmon which had formed on the back of the first phalanx of the middle finger of the right hand. It was connected with a molluscous wart, and there were two more warts of the same character attached to the inner surface of the next fore-finger. The whole of the back of the hand was puffy, from the inflammation. Poultices with linseed-meal did very little good. There appeared to be no tendency to form healthy pus. This was remarked by Mr. West, a medical gentleman who was with me at the time; and he was not a little surprised at my declaring that a good maturation would take place if the girl should cut her wisdom teeth. The mouth was examined, and it was found that she had thirty teeth; the two last molares in the lower jaw had not protruded: they were covered with thick cartilaginous gum. I pointed out the raspberry-and-cream tongue. The girl refusing to have the gums divided, had directions to take six grains of calomel at night, senna tea and Epsom salts in the morning, and to go on poulticing.

Two days afterwards, the hand becoming rather worse, she applied to have her gums lanced. They were freely cut, and in another couple of days she called again to shew me that her hand was well. Dr. Rigby happening to be with me at this time, I called his attention to the case.

*Porrigo favosa* is by no means an uncommon coincident with dentition, and the local treatment of the disease is most judicious when little other interference is made than arises from cleanliness and water dressing. The disease vanishes when the teeth and jaws become settled into normal relations with each other.

*Porrigo scutellata* is always connected with anormal trains of growth about the teeth and jaws. The disease is catching from child to child, but seldom from a child to an adult, unless the adult have not completed the development of the full complement of the teeth. A woman, of the name of Holmes, residing at Walworth, is the "Preparer of the Vegetable Ointment," with which she readily cures this complaint in a very short space of time. The head, observed after her treatment, is covered with an uncommonly large quantity of scurf, which continues to be secreted for



a long time after the head is cured. It would seem that her ointment has the property of changing the morbid porrigo scutellata into an abundant healthy secretion of the natural scurf of the head. The usual secretion of grease about the face and head is in many cases of dentition most abundantly increased—a relief, no doubt, to the cerebral irritation. The secretions about the mouth are very frequently not only increased in quantity, but occasionally much altered in properties, in certain individuals, during the development of the teeth and jaws. Children are found to slobber very much during dentition, and sometimes for months before the teeth are cut. It would seem that sucking the thumb is a provision for the exercise of the organs concerned in developing the teeth, by which a secretion is obtained that materially relieves the head. So important is secretion to the relief of the head, that some children are found with a sneezing, and abundantly secreting catarrh, with every tooth they cut. Persons subject to habitual catarrh, are cured by affording relief to cerebral irritation, by inducing the skin and mucous surfaces of the bowels to secretion. A solution of small quan-

tities of the sulphates of potass, soda, and magnesia, taken daily, in the morning, with occasional small doses of the oxide of mercury, ipecacuan, and James's powder, at night, sponging the surface with warm vinegar, and rubbing, are good measures for persons subject to catarrh, as well as for those who are anormally developing teeth and jaws. These are, indeed, the very persons who are most liable to catch colds, and, for the most part, they take cold heavily. If they attend pointedly to their bowels, to ensure daily good evacuations, of healthy colour and quality, they avoid their proneness to such an inconvenient complaint.

Porri<sup>go</sup> larvalis sometimes is cured during the progress of dentition, leaving an unseemly and troublesome puckering about the mouth and cheeks. Most often this unpleasant state is continued until the teeth and jaws have established a harmony with each other. A question has often been asked of me, relating to my treatment of porri<sup>go</sup> seutellata, and other eruptions about the head, coincident with anormalities of dentition—how do you proceed to cure them? The only local application necessary after the hair has been removed, is the water-dressing

recommended by Professor Macartney : clean lint, soaked in water at 98° Fah. applied to the head, with a skull-cap of oiled silk, or of India rubber camlet, to prevent evaporation ; great cleanliness should be observed ; the bowels should be regulated by mercurial doses. Regarding the mouth, the question is, what anormal condition is present ? Perhaps deciduous teeth, which ought to have fallen out, are persistent : perhaps their fangs are not being absorbed with sufficient rapidity, and consequently the evolution of the jaw is not so complete as it should be. If the deciduous teeth be in fault, they should be removed. If coming teeth have hardened gums in their way, or from other causes, require liberation, the gum-lancet should be used freely. No particular rules can be given about the employment of this instrument which are not found in the books on dental surgery. The general principles which ought to regulate us in its use are very simple. I believe it should be used whenever we have good reason to believe that an unloading of vessels about the capsule of the coming tooth is indicated ;—whenever the coming tooth is obstructed by a hard, a thick, or a difficultly-absorbable gum ;—whenever,

from an ample space being present, the tooth has abundant room to develop itself, yet remains deep in the gum, and is attended by convulsions or other serious symptoms of developmental disorder.

If the teeth be not thus attended to, porrigo scutellata will in some cases be obstinate for years. On the other hand, country air, to favour the progress of development, the regulation of the course of dentition by art, and attention to the secretions of bile and urine, by the due administration of alterative doses of calomel with ipecaeuana, and gentle aperients, will sometimes cure the disease in a few months—often in a few weeks. In most of the diseases of the skin in children, oxide of mercury, with chalk or with soda, or calomel in small doses, judiciously administered, has a remarkable effect in promoting secretion in the mouth, at the same time that the disease of the skin gives way to its influence. There are many cases, however, in which it is inapplicable. Invigoration only is wanted. Some children require for this purpose country air, cheerfulness, and the absence of unpleasant control, easily ensured only when that part of philosophy known as common sense is exerted in education. A boy

was brought to me by an aunt, who had kindly undertaken to give him some country air, if it were advisable for him. She told me he was ten years of age, and had for the last six months become quite dull and stupid—a result that she had attributed to his mother's want of patience with him. He was of a strumous temperament, and was afflicted with *porrigo scutellata*: the submaxillary glands were very large, but soft; his tongue had the raspberry and cream character; his bowels were usually constive, but he took medicine sometimes; his breath was very offensive, and his whole body had a rank odour. He had no taste for reading, and his mother, who was a widow, attempted to instil it by scolding and cuffs. The boy said reading made his head ache, and that head ache was often followed by sickness and stomach ache, which he believed were good reasons for not liking to read. His teeth were in a sad state: the incisors were complete, but very yellow and dirty; the anterior bicuspids were in their places, the posterior bicuspids were in progress; the anterior molars in the upper jaw were decayed, in the lower one had been extracted, the other had the blue appearance prepara-

tory to decay. There were large spaces preparing for the protrusion of the second molares, and the gums were here much swelled. I advised the removal of the bad teeth, and that the lad should take alterative doses of mereury, oecasionally ehanging the medicine for milk of sulphur and cream of tartar, or senna tea and jalap; country air by all means. Nearly a twelvemonth elapsed before I saw the boy again. He had been in Yorkshire and had lived well. He had shed the canine teeth, and was completing the cutting of the second molares. I have seldom seen so striking an alteration. The boy had become a smart fellow, with a healthy and vigorous aspect. His aunt had coaxed him into a taste for reading.

Sealled head, ring-worm, scabby face, running behind the ears, are often observed by nurses to be coincident with dentition. It is when we apply learned names to these diseased states that our pereceptions become more hazy:—warts, mollusca, porrigo favosa, sentellata and larvalis, urtiaria, herpes, psoriasis, pityriasis, erysipelas: these I affirm to be not uncommon attendants on anormal dentition. Some of them are commonly coincident with the anormal

progress of second dentition in children; others are found in those constitutions in which, from about twenty to fifty years of age, the wise teeth remain either hidden in the jaws, or are making slow efforts at development.

In the greater number of cases, diseased states of the skin relieve the brain of its irritation; but there are conditions in which the mucous surface of the intestines is apt under such circumstances occasionally to manifest the suffering of a diarrhœa: but in other cases, if the disease of the skin abate for a time, the muciparous glandules are called upon for unusual duty, and a very abundant secretion of mucus takes place, which in a costive motion appears like pieces of fatty matter. When this condition is present, there is frequently a good deal of the remittent fever. Sometimes worms form—not an uncommon occurrence with children while engaged about their last deciduous molares, or about their first permanent molares. The fever, under this circumstance, is called the worm-fever. There is no doubt that when these parasite animals form there is always a cerebral irritation, during which the mucous surface of the intestines pour out a secretion that seems

to be their natural nidus. The presence of the lumbrici in children, and of the various kinds of tænia, is attended with the moaning, starting, incoherent talking in sleep, grinding of the teeth, &c., which are signs of the infantile remittent fever;—signs, too, of irritation, in the centre of the nervous system, propagated from an irritated portion of mucous membrane. May not the change in the mucous surface, which favours the existence of worms, be regarded as resulting from an abnormal condition of the development of the intestinal tube?

The distinctive signs of the infantile remittent fever may be merely light degrees of the symptoms attendant on cerebral irritation. When the developmental irritation is not very great, the fever subsides into a chronic state of disorder, and perhaps only some of those branches of the fifth pair of nerves which are destined to be the motor nerves of the eye may become irritated. In a chronic state, the friends of the patient do not perceive the error induced by this irritation so soon as the medical attendant: a slight strabismus is the symptom. The eye looks in towards the nose; occasionally it looks outwards. In the course of early de-



velopment some entanglement of structure—some irritation on the mucous surface of the alimentary canal—perhaps even some turgid state of the dental capsules, may induce an irritation in the brain, which shall end in a squint. This squint is a part of the train of signs indicative of cerebral irritation—an irritation confined at first to that part of the nervous centre where the nerves meet which relate to the part irritated primarily; perhaps to the part developing erroneously, and to the muscles of the eye determining the squinting; to certain portions of the fifth pair, and to certain of its intimate associates.

Chronic hydrocephalus is a congenital disease—the result of malformation—of erroneous development ab origine, or at a very early date of intra-uterine life. When this disease is present, there is always an error of structure in the brain, generally too in the spinal cord, besides a consentaneous anomaly, either as to size or epoch in the jaws and alimentary canal. It would seem as if an entanglement of structure during the progress of evolution could not take place in the brain without striking its vitiating influence upon the apparatus of assimilation. The nutrient organs

embracing the parts concerned in mastication and assimilation are in very intimate relation with some portions of the brain, as is evinced by the facts of original anomalies of the brain influencing the development of these organs, and the errors in the growth of these organs influencing the parcels of brain where their nerves concentrate. Errors in growth in all parts are liable to *varieties in degree*, and consequently the manifestation of inconvenience arising from their presence may vary too in degree. The irritation of worms in the alimentary canal, or the irritation upon a dental nerve, may be productive of a very slight strabismus, or it may be the forerunner of a squint, which strains the muscles beyond recovery:—The irritation may be accompanied by a turgid state of vessels about the optic nerve. It may have terminated in an effusion of fluid compressing a portion of the origin of the optic nerves. Amaurosis results. The effusion has been slight:—the fluid is reabsorbed without permanent injury to the nerve. The amaurosis vanishes when the irritation is removed. Should, however, the injury be more serious, and a permanent lesion of the nerve result, the sight is gone for ever. The same

events affecting the acoustic nerve may produce deafness. An aggravated *degree* of the irritation productive of these mischiefs continues the trains of evil to a very high pitch of disease—epilepsy, apoplexy, hemiplegia, and coma.

The manifestations of irritated nervous centre are often symptoms of diseases wide of our present immediate object of research, which is, to trace out the point that the trains of symptoms constituting the infantile remittent or developmental disorder are sometimes exhibited partially; a few without the rest; that they vary *in degree*; and that when the degree of irritation in the brain coincident with anormal development of the nutrient organs is extreme, a congregation of most or all of the separate symptoms takes place, and the acute hydrocephalus is the disease which crowns the phenomena. The flush and discomfort;—the sudden heat of skin, which goes perhaps in a couple of hours;—the sick headache;—the starting;—talking in sleep;—moaning in sleep;—the sighing and discontent;—the picking;—the transient squint;—the equally transient and irregular contraction and expansion of the pupil of the eye;—sometimes deafness;—tinnitus;—cough;—are merely slight degrees of the same

states which occur, in a severe manner, in the acute disease, water in the head. Some diseases, originating in an erroneous course of growth, are peculiar to certain ages; but those occurring before the body has acquired a higher state of perfection, may present themselves at a more advanced epoch; those, however, which arise when the organs are more complete, do not belong to infantile age. Thus, water in the head may occur at nineteen or twenty-five; hysteria never attacks a child at the breast. Dr. Butter tells us (p. 11) that the infantile remittent fever is a disease to which "mankind are liable from the birth to the age of puberty." It has already been shewn that this is the period in which the larger number of teeth are in course of growth, and though it is not pretended that the anormalities in the growth of these organs are the sole causes of the production of this disease, I feel warranted in concluding, from extensive experience, that its presence, and that of its extreme acute form—hydrocephalus, is most frequently coincident with anormal dentition. Dr. Butter's period for the liability to the disease is under this view very limited. Anormalities in dentition have been found to occur even at nearly sixty

years of age, and the developmental fever may, at that time of life, be very marked and very severe. A lady, forty years of age, applied to me more than a year ago, complaining of hemicrania; affecting, during its paroxysms, which were very severe, both her eyes, but principally the right,—that one on the side of the pain: the pupil of this eye was sometimes very considerably dilated, while the other was contracted. The paroxysms seized her at intervals of six weeks or two months, and confined her to her bed for several days together. There was a good deal of hysteria about her at times. Both in her paroxysms of pain and other times, she moaned and talked in her sleep. She is very apt to pick her nose, which itches considerably. In applying her attention to reading, she picks holes in the book before her. Her temper is very variable, and though an amiable person, she finds that occasionally she is subject to a dejected and discontented state of mind, without any cause that she can assign. When this state of mind comes on, she knows that she is soon to have a paroxysm. Her pulse then ranges above a hundred, and she is chilly. Afterwards she becomes flushed and hot, and at night perspires

profusely. A hard, dry cough and a sick headache come on, and then the hemicrania takes possession of the right side of the head. Sometimes, for a short time, she becomes blind, and as the sight is recovering, her sensibility to light is extreme. Her bowels were always costive, and her evacuations were most commonly scybalous, and of a greenish clay colour.

This lady has been liable to her attacks of illness about six years. She cut two dentes sapientiæ in the upper jaw soon after her first attack, and was afterwards for a long time much better. She never remembers to have lost more than one tooth since she was a child: she has now in the upper jaw fifteen teeth, the posterior bicuspid on the left side being wanting. In the lower jaw, there are fourteen teeth much crowded, and the incisors overlapping each other. The jaw is small, yet the spaces for the wise teeth are enlarging: the teeth do not appear to be near. This lady will, of course, be liable to her attacks of illness till the efforts to overcome the obstacles in the way of her two teeth are either triumphant or succumb; or it may be that a new train of disorder coincident to these efforts at development

may arise. In the meantime, she has been enjoined to keep the bowels regular as to consistence, colour, and quantity of the dejections,—a strict and daily attention to which measure ensures her more ease than she was wont to have.

Having shown that this disease is not so limited in its period as the authorities would indicate, I may endeavour to shew that it is different only from acute hydrocephalus in degree.

In the month of March 1831, I saw a nice interesting boy, of four years of age, suffering from a very severe attack of the infantile remittent fever. He had a dry, hard cough; hot, burning skin; suffused and anxious countenance; rapid pulse; peevish manner; great thirst; moaning; starting; picking; and other signs of the disorder. The head was remarkably hot, and the breath was very offensive. I examined the boy's mouth, and found that he had large spaces in the upper jaw, in preparation for the first permanent molares. In the lower, the spaces were not so large. I divided the gums in the upper jaw, but the teeth were rather deep-seated. Six grains of calomel, at night, was all the medicine the child took; and the next day, two dark motions seemed to remove all his

symptoms. On the 7th of September, this little fellow was again taken ill in the night. He had severe pain in the stomach, a burning skin, and great thirst. The mother thought the boy had swallowed a plum-stone in the course of the day, and immediately made some senna-tea for him, which had operated twice before I saw him at 11 in the morning. The motions were dark, sepybalous, offensive, and slimy; copious, with much fluid in them. They had relieved him a good deal, but he was still very ill. There was a fretful discontented aspect, constant whining; he picked at his nose and lips incessantly, and cried out if much light was admitted into the room. His pupils did not contract alike; when a little light was admitted, the pupil of the right eye almost closed, while that of the left contracted very slowly. The right eye was slightly turned in towards the nose. The tongue was loaded at its back part like chamois leather, and at its fore part it had decidedly the cream ground, with the raspberry papillæ. The skin was dry, but not very hot; the pulse was 96, small, and wiry. He had not been well for three or four weeks. Ever since his attack, in March, he had perspired pro-



fusely in the night, and ground his teeth, and muttered occasionally. His mother, thinking he had worms, gave him some powders prescribed by a medical friend. These opened his bowels; and he had one given him at bed-time every now and then, but no worms were discovered in his motions. He would often be awake at three or four o'clock in the morning—would wish to drink, and would remain awake for an hour or two talking; then he would fall asleep again, and be in a burning heat. At other times he slept and perspired profusely. I remarked the squint, and was told that ever since March he had occasionally squinted, but “it came on and went off,” and so little was thought of it. He had often nettle-rash upon him, but his mother had seen nothing of this for the last six weeks. I gave the child six grains of calomel, and saw him the next day.

September 9th.—The little patient slept well, though occasionally through the night wanted toast and water. Has had two stools. Green bile and mucus. Urine high coloured, copious. Skin moist; tongue cleaner, but still loaded with a white instead of a dark crust. Belly soft; does not like it to be pressed.

Temper fretful; expression cross and discontented. To take a table-spoonful of the following mixture every two hours, taking after it toast and water *ad libitum* :—

Rx Sulphatis Magnesiae, ʒij.; Sulphatis Potassæ, ʒij.; Sulph. Sodæ, ʒj.; Sacchari Purif. ʒij.; Aquæ Menthæ Sativæ, Oss. M. fiat solutio.

In the evening;—copious watery stools, with slime, all day; at first dark, then light clay-coloured, dirty water. Urine scanty: but this report not, perhaps, quite correct. Abdomen flatulent; child will not have it touched. Skin hot; tongue much cleaner; pulse 140. The child is restless and cross. It has a teasing dry cough, and oppressed respiration.

Rx Calomel, gr. ij.; Extracti Opii, gr.  $\frac{1}{2}$ . horâ decubitûs. Cras mane; Olei Ricini, ʒij.

10th, (10 o'clock.)—He has slept very little; has ground the teeth at intervals all night; has started frequently; has occasionally cried out, and talked incoherently—sometimes muttered. Has perspired profusely all night. Bears the abdomen to be pressed, and is in better

spirits. Vomited the oil this morning. Has had no motion. Pulse 96, soft; tongue cleaner. The mother is confident he will get well: she asks why he picks with his fore-finger so much? The nostrils are sore from being picked, and yet the boy continues at them.

At eight in the evening, the boy is said to be better in every respect, except that, within the last two hours, he has been very drowsy, and the skin was rather hot. He is now asleep, and is perspiring abundantly. He has a thumb in his mouth. One motion to-day, dark and offensive. He coughs less frequently.

11th, 12th, 13th, 14th, and 15th.—The boy has continued much the same; picking, starting, moaning, perspiring, every night. He has had rhubarb and magnesia, mercurial and chalk powder with scammony, and once calomel.

16th, at four in the afternoon, I find him with strabismus of the right eye: its pupil dilated. In the left eye, the pupil dilates and contracts very irregularly. Deep sighing. Pain in the right hypochondrium, increased on pressure. Wandering, anxious, restless expression of countenance. Awoke several times last night screaming. Pulse very irregular. Tongue raspberry and

cream. Bowels not open to-day. To take of calomel ten grains. Warm-bath, at 98 Fah. for half an hour.

17th, at nine in the morning.—The child screams at intervals. Pupils both much dilated; countenance sunken—  
anxious; has had a wretched night—  
tossing and crying out. One small motion this morning, black and pitchy. A great abundance of urine, which is not high coloured. Screams upon being touched; cannot bear pressure, especially on the right hypochondrium: sometimes the boy puts his hand there in the lightest and gentlest manner, and then puts it to his head. This short illness has produced great emaciation. The mother reminded me of my having lanced the gums six months before. I was confounded that I had, up to this moment, omitted to look into the mouth. The idea of the teeth developing flashed upon my mind. I examined the mouth. The first permanent molaris on the right side of the upper jaw was through the gum nearly one year and a half before its normal time. I liberated the tooth on the other side: it was ready to come through; and I scored down with the gum-lanceet upon the two corresponding teeth in the lower jaw. The child was

exhausted, and fell asleep. The mother was directed to put him into a warm-bath whenever he should awake. Two hours afterwards the boy was still asleep. In the evening the mother called upon me, to tell me he had had a bloody stool; but as he had craved for tea, and bread and butter, she had given him some, and he had eaten with an appetite. The next day the boy was sitting up, well, without squint or fever.

An interesting and engaging little girl, five years of age, was born with two teeth. They were inferior incisors, and dropped out to make way for others which have taken their place. At a very early period, this child began to squint; the right eye looks towards the nose. This squint is at times much more marked than at others. A medical friend in the country had, from this circumstance, prognosticated the approach of the acute hydrocephalus. He felt confident that the child would, sooner or later, be seized with it, and he was right. The little girl had been subject repeatedly to slight attacks of the infantile remittent fever. Calomel and senna had generally put the matter to rights. At last an attack came on which lasted several days, unaffected in its course by

any medicine that could be given. Calomel and other purgatives gave no relief. The child laid herself down on the couch and screamed if any one approached her. A touch on any part of her body seemed to give her agony. She was drowsy; had an offensive breath; a foul loaded tongue, with the raspberry and cream appearance at the edges and fore part, and the evacuations produced by calomel were dark and bilious, with seybale. The pupils of the eyes contracted closely upon the admission of light, and the child screamed out to have the room darkened. I found that the deciduous molares were all decayed, and the first permanent molares had, in both jaws, been in their places for some considerable time. Those of the lower jaw were much decayed. I proposed that they should be removed, but the parents could not, at first, be brought to consent. The next day the child was worse: the pupils of the eyes much dilated, the fever high, and all the symptoms of acute hydrocephalus present. Medicine seemed to have no power over the disease. The two first permanent molares of the lower jaw, useless and decayed teeth, were removed: the progress of developmient in the lower jaw

had room for its march. From that time the child began to get well, and in three days was playing about with the other children.

I was requested last autumn to see a boy, nine years of age, who had been three weeks ill of a severe remittent fever, under the care of a very intelligent general practitioner. The head had been shaved and blistered; repeated applications of leeches had been had recourse to; and all the medicines usually administered in such cases—calomel, &c., had been given. The boy was in bed, still very ill, with a rapid pulse, an anxious and fretful aspect, and a severe headache. I suggested that as he had not shed the lateral upper incisors, and as the deciduous upper molares on the right side were very much decayed, all these teeth should be removed. The gentleman was liberal and kind enough to attend to my suggestion directly. I saw the patient the next day, playing about, quite well.

That the train of events constituting the infantile remittent or developmental fever is but a part of that which leads to hydrocephalus acutus—that the one disease is but a lower grade of the other—is a proposition which seems to my mind

too clear to require additional illustration. I could detail numerous cases in which death, and the usual morbid appearances after it, have left no doubt of the nature of the complaint. They would all tend to demonstrate the point I am endeavouring to reach.

The symptoms belonging to the acute hydrocephalus are signs of cerebral irritation. When they are all present in a high degree, we conclude that danger to life is present. But parts only of the nervous centre may be affected, and the affection may continue for some time without being propagated to other parts. An endeavour has been already made to shew that strabismus and amaurosis may result as concomitants of developmental irritation. They are symptoms of water in the head; but when they occur as preliminaries of this horrible disease, they may often be cured by regulating the progress of development about the teeth and jaws, and thus the hydrocephalus, of which they were perhaps the harbingers, may be perfectly arrested.

A little girl, nine years of age, was brought to me by her mother, a very decent woman, whose husband was a bricklayer. The child was the eldest of



three living. Two of this woman's children had died infants, both of convulsive fits. The family was strumous. This weakly-looking girl had long had signs of the developmental disorder, but she had lately got headaches, particularly about the fore part, and occasionally she had with them a good deal of sickness.

For four months past, she had often complained of pain in the back of the balls of her eyes. The right eye had, "off and on," turned in towards her nose, and for the last week she was becoming quite blind. On placing her opposite a strong light, the pupil of the left eye contracted quickly; that of the right was but slightly influenced. The light made her head ache. She could not distinguish the number of fingers I held up, but she could distinguish objects in masses, so as to find her way about the room. She put her hand out when she came near a chair or a table, and appeared to see them, though she could not very accurately fix their distances or define their bounds. This girl had lost only one lower central incisor; another was loose. There appeared to be in her mouth no tendency to a very great change about the teeth:

she had cut the four permanent molares, and they were large and good teeth. The space between the upper central incisors was much less than it should have been, and the deeper parts of the gums were not so much injected as they ought to have been.

Seven incisor teeth were removed, and the girl had a dozen two-grain calomel pills given her, one to be taken every night, with a caution to discontinue them if the mouth should become sore. A week afterwards the girl was brought again to me. She had lost her squint, and could see very well; but she had inflamed tonsils, and quantities of ropy saliva from her mouth. The gums were not spongy, but the depths of them were much injected. No teeth appeared to be cutting, but the anterior deciduous molares were all four loose. The canine teeth were firm. I directed the discontinuance of the calomel; a blister under the jaw, and a solution of sulphates of soda, potass, and magnesia, in the quantity of half a drachm of each mixed together in three-quarters of a pint of water, every morning; a gargle of nitre, and rose-flower tea. The inconvenient symptoms soon disappeared, but no teeth came for nearly six weeks, when the

lower central incisors arrived. In four or five months she had four upper incisors making their appearance, and the two lower anterior molares having become brittle, broke down to stumps. All the deciduous teeth were yellow, with black specks, and dirty, while the four permanent incisors looked white and clean. Her development was proceeding much more rapidly than at first, for now spaces were beginning to form behind the permanent molares.

A young lady, thirteen years of age, with black hair and eyes, was brought to me on account of sick headaches, and a pain behind the balls of her eyes. The pupils were small, but they did not contract very quickly upon exposure to light. She had always a haze before her, and for the last five weeks could not see to read without experiencing pain in her eyes and in her forehead, and about the brows. If she persisted in trying, she became sick. She was very costive. She moaned very much in her sleep, and started a good deal. Her hands were always hot at night, and her throat was generally husky, and often sore about bed-time. She had all her teeth, except the second molaris on the left side of the lower jaw, and the

bicuspid on the right side of the same jaw, which ought to have replaced the second deciduous molar tooth, but which could not protrude, for the deciduous tooth still remained. This was removed with great ease, for the fangs were almost absorbed. A thick chondromatous gum, over the coming second molar tooth, was freely lanced. Small doses of blue pill, ipecacuanha, and compound extract of colocyath, were directed to be taken on alternate nights. In ten days the patient was quite well.

There must be some good reasons why we are not so successful in the treatment of deafness arising from manifest injury to a nerve, as we are in the treatment of affections of the eye. I have seen several cases of deafness partially cured by the removal of a tooth which compressed a wise tooth, and prevented its progress. I have known instances in which deafness was much relieved by the removal of a compressed, useless, badly and late developed wise tooth. But the lesion, probably, of the chorda tympani, from pressure of the dental nerve, takes place to too severe an extent before the connexion of the morbid phenomena is discovered; and the drawing of the tooth in fault is had recourse to at a period too late to be of much benefit.

It has been my lot to see numerous cases of inflamed tonsils, concomitant with the cutting of wise teeth; and I have seen four cases of profuse ptyalism, concomitant with the same event. Not a grain of mercury had been taken by these patients, although the fœtor very much resembled that of mercurial ptyalism.

The fœtid breath to which some people are subject during the progress of the dentition of the last molares, is a very curious matter for investigation. With many it is the only symptom of developmental disorder, while with others it is joined to other signs, and has been a part of the remittent fever accompanying the irregular growth of the earlier teeth. With some it resembles the mercurial breath, while with others the odour is more analogous to the secretions from some of the glandular structures near the anus. The symmetry of the two extremities of the body is more than a fanciful anatomical dogma. (See Meckel, *Man. d'Anat.* tom. i. p. 31.) The consideration of the facts connected with this subject may at some future time lead to important pathological results.

A gentleman, thirty-three years of age, began to cut his wise teeth. His

health was hardly affected by the process. He was rather more costive than he was wont to be, and found that wine and malt liquor had the effect of giving him a headache. He was more sleepy than usual. His breath became insurmountably offensive, and it continued in this state for nearly two years, by which time he had cut the last tooth. After that his breath was not at all tainted.

The foetid breath is a symptom of cerebral irritation, as well as other parts of the developmental disorder, and like any other individual of the distinctive family of signs, it is not necessarily present in all cases. Sometimes it is present without any of its companions. These signs of cerebral irritation it has never been pretended are confined as coincidences to a development of the teeth and jaws. The brain and nervous system may manifest the existence of some anormal condition,—some irritation, by the presence of a few or more of the symptoms of fever in concomitance,—in coincidence with a disordered condition of skin, or with a disordered state of the dermoid part of the stomach, alimentary tube, gall bladder, urethra, bladder, or other mucous surface; or they may evince an idiopathic irritation,

the consequences of which may be disorder in some other part of the body. Specific alterations of structure in various organs are sometimes preceded by a peculiarity in the fœtor of the breath, and often, in such cases, there is some sign, however slight, of mental disturbance. Those who study the diseases of women would do well to look into the physiology of this subject. The disorders of the organs of reproduction, particularly in the female, exert a curious influence on the brain and nervous system. Whatever may be the concomitance of local disease with signs of cerebral irritation, the fœtid breath, which may vary much in its character of odour, is generally attended, more or less, by some alteration in the condition of the patient's mind. The *degree* of caprice, of melancholy, of low spirits, of fretfulness, of irascibility, perhaps of pride, may of course vary; but however slight may be the degree of mental disturbance, it is always present, more or less, when fœtid breath manifests cerebral irritation. In the child with the "infantile remittent fever," as well as in the woman of adult age, the brain is apt to indicate a peculiar state of disorder by the presence and coincidence of these

symptoms. Now and then, a married man, who is weak enough, or brutal enough, not to exercise the sympathy and tenderness which a woman requires most especially in this state, may by his selfish and unfeeling conduct have produced one of two consequences,—fainting fits, with wandering neuralgia and spasmodic twitchings of the flexor muscles, the first *degree* of epilepsy,—or, a complete alienation of mind.

The question as to the organs which emit the fœtor, is not yet, to my satisfaction, settled. Some dyspeptics, whose occupations are sedentary and studious, cough up from the chest small lumps of yellow mucus, which emit, in a concentrated form, the peculiar fœtor of their breath. Others, who have not a single decayed tooth, but who may be preparing to cut teeth, have sometimes the fœtor attached to the juices about the gums.

There is, no doubt, a variety in the odour, as well as in the condition of the health, of the individual labouring under the symptom of fœtid breath.

A young gentleman, of light hair and eyes, of a strumous temperament, seventeen years of age, had a faint and very peculiar odour of breath. His mind



was excited by several harassing considerations, and he was attacked by delirium. Violent conduct, and a desire to destroy numerous objects that came in his way, were the manifestations of aberrant intellect. In other respects his spirits were extremely high, and he was full of fun and joyousness. The uncontrollable desire of mischief rendered it advisable to put him under restraint. One of the most experienced physicians of the metropolis decided upon the hopelessness of a cure in this case; and the opinion was founded upon a range of facts with which it falls to the lot of very few to be conversant. I one day persuaded this patient to allow me to use my gum lancet freely upon some large spaces of gum covering developing *dentes sapientiæ*. In a week afterwards I heard that he was quite well.

In the "*Memoire sur les diverses espèces de deviations dont est susceptible la dernière molaire, &c. par Alp. Toirac, Docteur en Médecine, &c.; 1828,*" at page 6, appears this passage:—

"M. Esquirol, à qui j'ai communiqué cette observation, m'a rapporté qu'une dame atteinte de folie avait été amenée à sa maison de santé, et qu'il l'avait

rendu à la raison, en favorisant, par une incision cruciale, la sortie d'une dent de sagesse. C'est, autant que je puis me le rappeler, le célèbre M. Duval qui pratiqua l'opération."

Is the fœtor attendant on the irritation coincident with anormal development of the teeth and jaws much modified in its characters after the period of puberty? Up to the age of thirteen or fourteen, the nervous system is busy in attending to the development of the teeth and jaws, as well as to the other organs of nutrition. After that period, the organs of reproduction occupy some of its attention; and in considering the influence exerted by anormal developments on the nerves, we are led to give a due share of importance to the new organs which are now to superadd their functions to the complicated organism of the individual.

An opportunity has been taken to analyse those spasmodic affections to which persons labouring under anormal trains of development are liable before the age of puberty, and to which others may have been liable, though failing to exhibit the complication arising from the growth of a new set of organs. Fœtor of breath may be present as a coincidence

of various complaints about the pelvic viscera, and its characters may vary a good deal without involving *much* irritation about the brain. Suppose a *complicated* anormal state of development, are there peculiar symptoms indicating such a state? If the development of the teeth be not completed at or about the fourteenth year to the full complement of twenty-eight teeth, is the development of the organs of reproduction retarded? or, is this train of growth attended by inconveniences denoting the existence of cerebral irritation? and are the signs of such cerebral irritation different from those attendant on a simple, uncomplicated, anormal development of the teeth and jaws?

Dr. John Clarke (Commentaries, p. 76) has well observed, "that fewer inconveniences attend on dentition, when the process goes on slowly, than when it is more rapid." A retarded development, in fact, though occasionally abundantly inconvenient, is not generally attended by the same train of evils, and especially about the period of approaching puberty, as a hasty growth of the teeth. The development of the organs of reproduction may be retarded, but in most cases the consequent errors of health are not

very serious. Signs of the developmental disorder may be present, but for the most part they are slight in degree, or of transient duration. The inconveniences arise generally from a want of harmony in the development of the osseous and of the dental structures, by which the trains of growth belonging to two different septenary periods are mingled in some confusion. An asthenic condition results, with perhaps a start in growth of the whole osseous fabric. The individual grows taller, and if country air and other invigorating circumstances be afforded, a balance of growth results: the teeth are put forth with a sufficient space in the jaws to allow for the gradual progress of the wise teeth. If, however, a different train proceeds; if the asthenic condition continues, unrelieved by circumstances tending to invigorate the frame, the patient droops. The tendency to erect attitude gives way to a stoop; the head comes forward; the chest contracts; and for a year or two the individual appears to be undergoing "a great change of constitution." A few or more of the signs of developmental disorder affect the individual. The teeth come through; asthenia and cerebral irritation remain.

Then what has cerebral irritation to do with anormal dentition? There must be some other cause for it. There is, indeed, in such cases. The chest has become too small for the organs of respiration; the trains of growth in various parts of the body are deranged; and obstructed development is accompanied by cerebral irritation: but the commencement of the train of disorder has been perhaps originally in the organs of nutrition. As far as I have been able to examine into the subject of the manifestations of cerebral irritation occurring as signs of complicated series of development, I should conclude that there is always a predominance of manifestation of the irritation belonging to one set of organs or the other; and that there are at first few signs of complication. If the teeth be not fully developed, there may be a retardation of growth in the reproductive apparatus, and the suffering existing in the dermoid system, irritation may be communicated to the absorbent and glandular systems. Atrophy may result from mesenteric mischief thus induced; but all this while the development of the reproductive organs is suspended. The determinations of growth in particular parts, are very

curious. The laws of normal development being suspended, the normal trains of progress in one set of organs appear to be arrested, in order that the anormal developments of other organs may proceed. Geoffroy St. Hilaire's law of one organ being developed in an undue excess at the expense of some other, may thus be carried out to the proposition, that if the visus of growth affect an organ obstructed and bound down in the course of its development, other organs suffer in the volume and epoch of their developments. In some cases in the female, the growth of the teeth being complete, menstruation commences : perhaps in a short time it may be suspended, in order that a preceocious development of the last molares may proceed. There may not be sufficient energy in the system to complete this portion of growth : it requires a consensaneous development of the jaw bones, which not proceeding, the teeth in vain attempt to emancipate themselves. The jaws, perhaps, take a start in growth ; if they do, the inconvenience is not so serious ; if they do not, a very common constitutional disturbance is a giddiness in the head ; weak eyes ; sometimes dimness ; ringing in the ears ; sometimes

deafness ; a sense of weight, or a sense of heat, compared by one young lady to *inward chilblains*, at the upper and front part of the crown of the head. It may sound very strange to some who imagine themselves pathologists, and who confuse their own intellects by taking certain narrow and limited views of the morbid anatomy of the organs in the thorax, to state that "consumption," or that disease which they have now and then, by the aid of their stethoscopes, declared to be incurable, may, in numerous instances, be most advantageously treated as the result of irritated nervous centre. A hectic fever, with evening exacerbations ; much accelerated pulse ; cough, attended by abundant mucopurulent expectoration ; pain in the left side, with sense of weight and stricture across the chest ; night sweats, and extreme emaciation of the body ; œdema about the ankles, and diminished secretion of urine, constitute a case that has been condemned as hopeless : such a case has been successfully treated by a strict attention to the allaying all signs of cerebral irritation ;—the true explanation of the principle of that treatment which succeeded in Scotland, in the hands of a reverend divine. But an

atrophy, with cough and other signs of developmental disorder, is not really consumption or pulmonary phthisis; it is often difficult to say when the fatal disease has set in. The confidence with which some persons pronounce a prognostic is not always a sign of wisdom from experience: some cannot learn from this teacher. Phthisis pulmonalis and atrophy are often concomitant; they are frequently coincident with the same trains of anormal development. The teeth and jaws, the bones of the thorax, and the spine, may have simultaneously an anormal development. We may observe the vicious configuration of all these parts in an individual, in some cases, without being able to indicate the source of the faulty trains of growth. There are many cases in which a consentaneous bad configuration of the body is present, in which the nîsus of development in the four wise teeth considerably aggravates all the present inconveniences. In a girl asthenic from faulty configuration, development having proceeded to an extent to disturb the balance of her powers, an atrophy may accompany the effort at developing wise teeth. The developmental disorder, perhaps with not *all* its symptoms,



accompanies the illness. Menstruation may have commenced; it ceases. If the nusus in the teeth be quieted for a while, the menstrual flux returns. The patient is for a time better, for the normal train of development, that of the generative organs, is proceeding; but the dental nusus is again active, and again the former trains of disorder are present. A very amiable and interesting girl of fifteen, with dark hair and grey eyes, of a nervous temperament, had menstruated once. It was supposed in March last that she had caught cold, for a very painful stiff neck ensued. The sterno-cleido-mastoidens, and a part of the trapezius muscles of the right side, became quite rigid. The spasm increased, and the occipital portion of the trapezius felt like a bony tumor, as large as an egg; the pain increased; a precocious development of the wise teeth had begun. Calomel and anti-spasmodics, Dover's powder, &c. having afforded no relief, the gums were freely lanced. The operation had some immediate beneficial effects; but this young lady's teeth being very unusually large, and the jaws not growing with sufficient rapidity for the space required by the coming teeth, so much pressure ope-

rated to keep them back, that they could not come through. At the end of a fortnight another severe attack of the rigid spasm caused the poor sufferer agonizing pain. The gums were again scored, and the health was a *little* improved. About this time the influenza attacked her, and the cough was very severe. Nearly five weeks elapsed before she recovered from this new complaint, the painful wry neck continuing all the while. Blisters, tartar emetic ointment, and rubefacients, were had recourse to without benefit. An endeavour to promote absorption of the gum, by scoring it with the gum lancet, gave most relief. The poor patient became extremely emaciated, although the appetite was good, and the food appeared to be well digested. In July the left arm became paralyzed; and this was followed, in August, by paralysis of the other arm, on one knuckle of the hand of which there had for some time been a steatomatous encysted tumor, that now became inflamed, and discharged its contents with much pus and some slough. The atrophy became extreme; by degrees the legs lost their power. Under the idea that the developing teeth, which appeared to be advancing most

rapidly in the lower jaw, required space, the two second molares were extracted. The benefit was not striking, but a burning pain, and sense of weight on the top of the head, about the frontal and parietal bones, becoming very urgent, it was thought advisable, on the 16th of September, to remove the corresponding second molar teeth in the upper jaw. The operation was succeeded by immediate relief to the head, and a partial restoration of the power of moving the fingers of the left hand.

14th October.—Notwithstanding the cutting of the wisdom teeth, her mother observes that the debility and emaciation increase. Before the teeth were removed, a great quantity of coloured fluid and ropy saliva came from the mouth when she slept. This ceased immediately afterwards. The teeth being developed, a change has taken place in the urinary organs: a great quantity of urine passes, and upon several occasions small quantities of blood have been discharged by stool. Occasional symptoms of hysteria, especially the spasms about the throat, with low spirits, have been present lately. She has had a reddish-coloured discharge, of very peculiar odour, from the vagina, for some time

past. When the process of shedding the teeth commenced, about seven years of age, she had a leucorrhœal secretion, which continued off and on at times for about seven years, and then ceased.

January 10th.—This poor young lady has continued to suffer from the extreme emaciation to which she is reduced. An old medical friend of the family, now retired from practice, but well known by a high character for extensive acquirement and great moral excellence, was kind enough to afford me his assistance on a visit to this patient; and she has derived great benefit from his suggestion of the application of a circular cushion, filled with horse-hair, a material easily cleaned, which has been the best means hitherto employed of removing pressure from an extensive slough on the hip.

Since October the urine has varied in quantity as well as in character: it has been sometimes mixed with blood. In December the abdomen swelled; a severe pain in the hypogastrium continued several days; the urine became scanty; the bowels relaxed; and mucus, blood, and pus, were said to be mixed with the fæces. The mother thinks it very probable that the purulent discharge mixes itself in flowing from the vagina

with the feculent matter. Sometimes the fæces have the appearance of pure bile with mucus. The appetite continues good, and the food is relished. There has been pain in the left hypochondrium, extending up the side of the thorax, and acute pain in the head whenever the patient is moved. Repeated blisters, and occasional large doses of landanum, give some relief from all this suffering. Had I been bold enough to sacrifice the four molar teeth which obstructed the development of the wise teeth at an earlier period, I feel convinced I should have saved this young lady a world of pain and other evil.

The leucorrhœal secretion noticed in this case, occurs not unfrequently to children during the progress of their dentition, from seven to fourteen years of age. Sometimes the discharge is almost aqueous, with a slight mixture of mucus; at others it is muco-purulent.

A poor woman brought two little twin girls to my house one morning; they were diminutive delicate looking children, with sandy hair and light eyes. Each child had a rather abundant puriform mucous discharge from the vulva. Both had cut the four permanent molares. One had lost the two deciduous

anterior inferior incisors; the other had one very loose, but had as yet lost none. Each child had all the incisors of the lower jaw, and two in the upper jaw, removed. The mother was directed to give these children milk of sulphur, and cream of tartar, with treacle, daily for a week. She came back saying the discharge was quite well.

A lady in my neighbourhood, the mother of a fine family, all of them more or less abnormal about the teeth, consulted me about a little girl between seven and eight years of age, that had a mucous discharge from the vulva. She would hardly believe me when I told her that the child's teeth were in error. The complaint got well when two superior central incisor teeth were cut, which had remained in the gums much longer than their normal epoch.

In the work on the Teeth by John Hunter, at page 126 of the second part, this case occurs:—

“ A boy, about two years of age, was taken with a pain and difficulty in making water, and voided *matter* from the urethra. I suspected that by some means or other this child might possibly be affected by the venereal poison; and the suspicion naturally fell on the nurse.

These complaints sometimes abated, and would go off altogether, and then return again. It was observed at last, that they returned only upon cutting a new tooth. This happened so often, regularly and constantly, that there was no reason to doubt but that it was owing to that cause."

It is often found that when there is a mingling of the developments of one septenary period with those of another, what is vaguely called a sympathy appears to exist between the generative organs and the skin. The one set of organs is not unfolded, so as to evince the maturity of the age to which the individual has attained, for the skin is tardy in some of its stages of progress; perhaps the teeth are not so forward as they should be; perhaps they are kept back from a want of room in the jaw, the bone of which, instead of becoming more loose, more cellular, more spongy, remains hard, compact, and contracted. In such cases one is never surprised to find some diseased condition of skin, with occasional fever, or with fits, or with some other symptoms of developmental disorder.

A young gentleman, sixteen years of age, with dark hair and eyes, soft large

pupils, fine skin, of a nervous temperament, tall and slender make, had been placed with a tutor preparatory to his entrance at college. He was very assiduous at his studies, and it was supposed that several attacks of heat and flushing, followed by profuse bleeding at the nose, resulted from too intense application. There can be no doubt, if signs of cerebral irritation be present, working the brain by either intense thinking or by anxiety, vexation, or grief, must aggravate, instead of tending to allay, the mischief. Upon inquiry, it was found that this young gentleman had for nearly two years past been subject to *sick headaches*, which sometimes incapacitated him for the exertion of study for a week together. When these paroxysms seized him, he would rest his head upon his hands, placed upon a table, or lie down across some chairs, in a very dejected state of spirits, and be disinclined to speak to any one. Occasionally a desire to vomit seized him, and if he could bring some bile off his stomach, he felt relieved for several hours. Calomel, with other cathartics, seemed to be very appropriate medicines, for they relieved him in a shorter time than other remedies. In the day his



hands were burning, in the evening they were damp. At night he was flushed; and soon after he got into bed he perspired so much as to make the mattress on which he slept very wet. His sleep was accompanied by apparent dreams, of which he himself was unconscious. He started and moaned a good deal through the night, and on one occasion became a somnambulist, having, about three in the morning, walked through two adjoining chambers, rested his hand upon a table for three or four minutes, and then returned to his own bed-room. He was quite unconscious of having done this. He was constantly picking his nose, and had the habit, which was irresistible, of picking out inequalities on the surface of the paper in books he read. A cough, dry, hard, hollow, and loud, seized him in paroxysms, unaccompanied by pain in the chest, or by pain upon pressure in the hypochondriac region. His breath was generally very offensive; his tongue either loaded and yellow, like chamois leather, or whitish, with interspersed red papillæ like raspberries and cream. He did not *complain* of bad digestion, though he ate a small meal with such rapidity and eagerness that his food was bolted. He was so habi-

tually costive, that he had frequently been eight days without a motion, and had repeatedly gone without one for a fortnight. If he had a natural tendency, without the aid of medicine, to go to the closet daily for a few days, he observed that his evacuations were very hot in passing, and his skin itched considerably: in fact, he was attacked by the pectechial urticaria, which generally lasted, in the shape of large wheals about the abdomen, scrotum, nates, and thighs, for three, four, or five days, and left in their places purpura urticans. Herpes præputialis often accompanied this eruption.

This young gentleman was unusually nervous when among strangers. Upon these occasions, a slight stammering, which was habitual to him, was converted into a distressing impediment in his speech, and any unusual continued excitement produced an intense headache. Puberty is said to have taken place at fourteen. His beard and whiskers are hardly perceptible. The tone of voice is soft, but manly.

Upon examining the mouth, the fauces were observed to be unusually red; the velum palati and tonsils flabby and enlarged. In the jaws and teeth,

the development was anormal. Some set of circumstances, of the nature of which we are at present quite ignorant, had operated to retard the due course of growth: that arrangement which ought to have been complete at or before fourteen years of age, was not yet established. The normal trains of growth had been subverted, and the type of structure belonging to the second was mingled with the type of the third septenary period. The time of life which ought to be devoted by the constitution to the gradual improvement of the organs of reproduction, was partly engaged in the duties of unfolding the teeth and jaws; and unfolding them not regularly—not normally—for this young man was found to be cutting two teeth on the right side of the jaws, and one in the upper jaw of the left side, while the space in the lower jaw, behind the first molar tooth, was hardly sufficient for a tooth that had not yet passed. The incisor teeth in the lower jaw rode one over another. All the first molares were becoming blueish, and the teeth behind them did not take their proper alignment, but assumed a station rather external to the tooth before. On the left side, the posterior bicuspids had lately

been extracted, in consequence of tooth-ache. The gum in the lower jaw having been freely and crucially incised, the patient was enjoined to keep his bowels open, and to have a strict observation of the colour and consistence of his evacuations. To regulate these, he had occasional pills, compounded of blue pill, calomel, ipecaeuania, and cathartic extract; and habitual pills to take daily—composed of rhubarb and extract of jalap. He was told to use the warm shower-bath in the morning, and frictions with a huckaback towel over the chest and back, after having sponged these parts with warm vinegar and water, at night. He had directions to employ his mind in amusing trains, and not to study hard.

Five months elapsed before I saw my patient again. The summer had been spent with some relations, in excursions round the southern coast of England. He had gained flesh, was much improved in health, and had almost lost the habit of stammering. The second bicuspid in the upper jaw on the right side had plagued him, and he had had it extracted. The two first molars were decaying fast.

A normal train of development of the

reproductive organs in the female is unattended by inconvenience. An anormal train entails hysteria. The hysterical tendency is, for the most part, not accompanied by circumstances entailing dangerous lesions of organs. It is different where anormal growths of the teeth and jaws inflict their penalties. A continued, unrelieved pressure upon a nerve in the jaw-bone, becomes attended by spasm, by convulsions, and may even terminate in death. A difficulty may, however, arise in distinguishing the nature and source of a clonic spasm. The analogy between the spasm of hysteria and that of epilepsy, is very close. In some cases it is not easy to say whether a person has had a fit of epilepsy or one of hysterics. A clonic spasm has been present, attended by fulness of the throat and a sense of choking; which may have been a degree of epilepsy, or a paroxysm of hysteria. A confusion of mind and loss of consciousness, vary only *in degree*. Epilepsy coinciding with anormal dentition, has no influence on the urinary organs, or, if any, its tendency is to suspend secretion; while these organs, being intimately allied to those of reproduction, respond to the agitation of hysteria.

There is in some constitutions an epileptic diathesis, having no connexion with anormal dentition. A tendency to form bone among the fibrous membranes of the encephalon, or to thicken the calvaria, may be present. This may be either congenital or aquired. In the cases that are decidedly congenital, the tendency to disease results, for the most part, as an hereditary disposition; and though the father and mother of the individual may not have exhibited marked symptoms of the complaint, an uncle or an aunt may have had fits. Often, however, some signs may have been present with the father, and the medical attendant, as well as the intimate friends, may have overlooked their relations to epilepsy. Whatever may be the antecedent or cause, the phenomena succeeding are very analogous.

In medicine it has been fashionable and convenient to speak of functional disorders. A function cannot be *perfectly* fulfilled unless the organ performing it be in a perfect state. The functions of an organ cannot be performed normally, without a normal condition of the organ. The brain can never be in a normal condition, where there is a diathesis rendering an indi-

vidual prone to epilepsy. One or more of the signs of irritated nervous centre always accompanies the epileptic tendency. An individual may labour under this disposition, and yet never have had a complete fit. There is no disease in the nosological lists so various in *degree* as epilepsy. One may, for years of life, have had only an occasional loss of memory, and a confusion of mind, with dimness of sight accompanying it: *sometimes*, added to this, a sense of choking, or of a lump in the throat—or a sensation, or a pain in the ends of the collar-bone, near the spot where the sterno-cleido-mastoideus muscle is inserted. A pulse very small and weak, or soft, full, and *very* slow, may often accompany some of these symptoms. For the most part the pulse is unusually slow: perhaps not in every case. If the digestion have not been good, the patient is drowsy, but has not a good night. He wakes up with a sense of numbness in one hand or the other; sometimes he is alarmed at this symptom, and a beating heart and some confusion ensue. Perhaps a cramp in the calf of the leg, or of the muscles of the foot, break up for a time the series of signs; but now and

then all the symptoms are relieved, by a curious change of state in the individual—a slight, or, according to circumstances, a more severe shivering fit; then a clammy state of the hands and feet, and a cold perspiration all over the body, followed by a headache, or an unconquerable drowsiness, which, however, does not always end in a refreshing sleep. A clammy mouth succeeds, with a loaded tongue; often with a fetid breath, and irritable capricious temper—an unhappy state of mind. The brain sends messages of weary discontent and inactivity to the liver; that organ becomes sluggish, sometimes enlarges, and contains quantities of packed yellow bile; at others accumulates vitiated dark bile. The bowels are obstinately costive, unless a dose of mercury opens the biliary flood-gates, when an angry accumulation of pungent material stimulates all the train of organs to action, and the brain is for a time relieved by the process; but it is only for a time. As soon as the stimulus is gone, the system resumes its tendency, and one or more of the signs of irritated nervous centre again exhibit themselves. Is it to be expected that, under such conditions, the organs of digestion will duly



perform their functions? It is curious to observe how well, in many cases, they *appear* to perform their duty; in others, indigestion tells the patient early of the troubles inflicted by an absence of the healthy power of assimilating his food. The stomach, with all the energy the brain concentrates towards this organ, cannot long perfectly digest unchewed, bolted meat. Dogs are prone to be unusually sleepy when they have on their stomachs unminced food; and in our own race the same fact may be observed. Sleep, the ally of epilepsy, may, in some cases, allow the nervous power to act with exclusive energy in the stomach. It is not then invigorating, refreshing sleep; it is not then repose—it is oblivion. The food may be partially digested: when the time arrives for it to leave the stomach—when new arrangements are in progress—when the nervous power has to supply other organs with energy—something is wanting: a discomfort exists in the abdomen; often, too, about the head. This is the time when the medical art can afford relief. If the train be allowed to proceed, vitiated bile accumulates in the liver, and a fit may supervene. There are constitutions in which the epilep-

tic diathesis shews itself in a desire to sleep and to snore, or to sleep without much snoring. The wakeful remission may be a train of caprice and ill temper, an ungovernable pride, or an imperious desire to have one's own way. Reason, sometimes the more tender affections, may modify the tendency of the paroxysm; but for the most part, where the epileptic diathesis exists with a large brain, these modifying circumstances have little influence; the individual liberates himself to degrading passions, and it is well if the salutary check of public opinion keeps him within decent bounds.

A very remarkable power of enduring extraordinary exertion without fatigue may occasionally be observed in persons who, with the epileptic tendency, possess a frame of firm structure. In India, such individuals have been able, under a burning sun, to take, with apparent impunity, during an indulgence in field sports, the same exercise which has thoroughly tired all the more healthy persons in company. This power of endurance is sometimes found in a frame which mingles the developments of two septenary periods. In such a case, the restoration of a harmonious balance

overcomes the tendency to the formation of fits, and subsequent loss of intellect. In a case where the developments *appear* to be complete, the probabilities are that in time the error of the encephalon produces dementia.

There is a picture of another division of the class of persons prone to epilepsy. Whatever may be the signs of cerebral irritation which may be manifested in the patient, anxiety is the preponderant character of mind. The subject is anxious about trifles as well as about matters of more serious importance. Worry, fretfulness, vexation, mark the countenance, especially if the *res angusta domi* trouble the man. Anger is not so often the mode in which irritation of mind is exhibited; the disposition is amiable, and the patient becomes an object of interest. One feels deeply the want of power to arrest, sometimes even to divert, the train of evil which is in progress. The lineaments of the countenance, often so obedient to trains of thought, are here obedient to trains of which we have yet no cognizance. The bony as well as the muscular fabric, obey the laws forced upon them; and if this take place before the jaws have ac-

quired an ample growth, an anormal development of the wise teeth may very materially aggravate the symptoms.

A variety of the epileptic condition is the disease called eatalepsy. It is a part of the vanity which characterizes some minds, not to believe in the existence of this malady. Because they have not seen the presence of all the symptoms, and to the full degree described by some authors, it cannot, forsooth, have any existence. Mr. Abernethy's great mind was not free from the weakness of disbelieving in eatalepsy. Like every other disease, this one varies in *degree*. It is, in the same individual, sometimes much more severe than it is at others. Some persons are prone to have it in a heavier degree than others; some are much more easily frightened than others. One patient, in walking through the street, may be quite appalled at the approach of a runaway horse. The degree of appalment in another may be quite trifling. Women are commonly much more easily frightened at the approach of a drove of horned cattle in the streets than men; and women are more frequently the subjects of eatalepsy than men. Fright, and sudden reception of new impres-

sions, are apt in some constitutions to produce appalment—a degree of stun—the temporary loss, without sleep, of all ideas. In catalepsy this state exists without a change of condition in the voluntary muscles. The patient remains, appalled, in the attitude in which he is placed by a by-stander. One of the most remarkable signs of catalepsy is a striking symptom too of epilepsy—the loss of consciousness regarding all that is passing around—a condition that a patient well named one of perfect obliviousness.

A young woman, seventeen years of age, was brought to me by her mother, with a story that one incredulous about catalepsy would not believe. The girl had been a servant of all-work in a tradesman's family, and had had a very hard place. The mistress had complained much of the girl's stupidity, and had at last discharged her. The mother said it was true the girl had been lately more dull than she used to be, but that was accounted for by the state of her spirits. A fellow-servant in a former situation had been run over by a coach, and had died in a hospital in consequence of the injuries she had received. When the intelligence reached this poor

girl she fell into a fit, gnashed her teeth, foamed at the mouth, and was quite insensible for more than two hours: it required several persons to hold her. Since that time, if any body spoke sharply to her, or came upon her suddenly, she was appalled, and remained staring, "vacant like," for some time. "If she happened to be standing, she would remain for several minutes: it was of no use speaking to her; she would stand still like an image." As she was coming to herself, she would be very nervous, get a shaking of her head, and *stammer* in endeavouring to speak. Latterly her spirits had been very bad, and she often burst into tears.

This girl had been, from her childhood, subject to an eruptive complaint about the elbows and knees, which had left her when she was seized with the fits. Her catamenia had vanished for more than six months, and her mother was very anxious to have "a prescription for stuff to bring them back." I looked into her mouth. She had thirty teeth, two of which, the first molares of the upper jaw, were quite decayed; they had never given her any pain. The last molares of the upper jaw were through; they had a blueish vitreous appearance,

indicative of a want of health. The wise teeth of the lower jaw had yet to be cut, but the spaces for them were confined, and the gums over them very hard. There was overlapping in a remarkable degree of the incisor teeth. The first molares in the lower jaw differed from all the rest, in being imperfectly developed about their tubercles, in being yellow, and ill formed. I applied the gum-lancet to the hard gums, behind the inferior second molares, and divided them very freely. The girl bore the infliction well; then, in two minutes, complained that the pain went from the jaw to her head, and suddenly she became sick. She made ineffectual attempts to vomit. I placed her on a couch, thinking she was going to faint. Her extremities were cold, and consciousness seemed to have forsaken her. For nearly twenty minutes she remained in a state like that of sleep, her pulse beating 58, and soft. A moisture broke out on her forehead, and consciousness returned with sobbing. I prescribed first blue pill and rhubarb, on alternate nights. When the secretions became healthy, she took sulphates of potass and iron, with diluted sulphuric acid and water.

The catamenia returned, but not till after the teeth were clear of the gums. The aspect of the girl's countenance was much lighter, and her spirits were much better.

Illustrations of very slight degrees of cataleptic seizure are perhaps not so rare as might be imagined. It is not very common to find them extending to fits of complete oblivion of mind, lasting for some hours.

An eminent physician, who had practised in a large provincial city, was passing through London. I met him in Regent-street, and the suddenness of my approach threw him into a state of obliviousness. He did not venture out without a companion, and the lady who was walking with him hinted that I had better call on him the next day. When I saw him again, he gave me a very clear account of the mode in which he was attacked. The fits of oblivion occurring sometimes twice in the course of the day, and being uncertain as to the periods of their accession, he was not able to trust himself out of his house without either a servant or a companion. He was at this time fifty-eight years of age, and had six years before been obliged to relinquish a lucrative practice



from occasionally not being able to recollect even the faces of his patients when they appeared before him. He went away to travel on the continent, and journeying from place to place in Italy, where the classic ground ought to have raised emotions of great delight in a healthy mind, so well educated as this gentleman's, he had constantly to regret that a fit of oblivion attacked him when he was engaged in viewing scenes which were of deep interest to his fellow-travellers. I remarked a curious arrangement of the inferior incisors when his mouth opened: there were only three in a space which ought to be occupied by four teeth. I learned that one had been removed nearly eight years before. But if one had been extracted the room was now filled up, so that a pressure from the back part of the jaw had obliterated the vacant space, and caused a complete approximation of the edges of the two incisors left apart from each other. On looking into the mouth, it was found that the last molares, above and below, had never been cut,—that in the upper jaw the *vis-a-tergo maxillæ* had played sad havoc among the teeth: a few stumps were left, the immediate removal of which I advised. I cut

away for him myself some cartilaginous obstructions to the progress of his wise teeth, which appeared, from long pressure, to have suffered in their integrity quite as much as the other teeth. He remained in London about a fortnight after, and told me that he was so much relieved of his oblivion fits as to be able to walk to my house without any want of confidence in himself: he required no companion.

Catalepsy with oblivion is not always distinct from epilepsy; nor is this complaint so distinct from hysteria as is often imagined. Trains of irritation, though perhaps not frequent, may occur in individuals peculiarly circumstanced, involving nerves supplying organs whose epochs of development may be very different. I was once consulted by a lady, who was poor, and who had seen better days, about her daughter, a fine well-made girl of nineteen. Two years before, this young lady had formed an intimacy with the apprentice of a tradesman, and her affections had become so much involved, that her health suffered from the disappointments to which she had been subjected. At first she had frequent hysteric fits, to which succeeded a very costive state of bowels, a peculiar

fœtor of breath, an irregular and painful menstruation, which had from its commencement at fifteen years of age been painless and regular, and a frequent condition of stupor and oblivion that much alarmed her mother. Lately she had become subject to leucorrhœa, and on three occasions the discharge had ceased suddenly, and the young lady had at each time fallen down in an epileptic fit, foaming at the mouth, losing all consciousness, and grinding her teeth with great force. On examining the mouth, I found that the upper two wise teeth were well through, the two lower had peeped, but were yet much covered with gum. The incisor teeth of the lower jaw overlapped each other considerably. The first bicuspid teeth on each side were thrust outwards, and the second, or posterior, much thrust inwards. I asked, for I had frequently, with such an arrangement of teeth, observed the symptom, if a pain, fixed, and uneasy, like a stitch, did not trouble the patient under the margin of the ribs, on the left side. I was answered in the affirmative. I advised that the mother should overcome her scruples of pride, and permit the lovers

to marry; she did so, and the young lady recovered completely.

It has been usual to ascribe to hysteria a variety of neuralgic affections to which young women are subject. The pain in the left hypochondrium, occurring especially in girls whose habits or occupations are sedentary, is frequently placed to the account of hysterical affections. It occurs most frequently in young women between the ages of sixteen and twenty-two, or later, according to the cutting of the wise teeth; and seldom in women who are simply hysterical without the complication of anormal dentition. It would be easy to offer numerous cases of this wearing neuralgia, in which an overlapping of the incisor teeth, and a thrusting inwards, from their due alignment, of the bicuspid teeth, consequent upon the pressure from the back of the jaw during the development of the wise teeth, has been coincident with the pain, which has ceased when the normality between the teeth and jaw has been sufficiently re-established. A neuralgia of the abdomen, in which the girl can bear no pressure upon the surface, may be often traced to disordered function of the uterus. I have not yet suf-

ficiently investigated this subject. Are there not conditions of the system in which a neuralgia or a spasm may result in inflammation? How the transition may supervene is another question, but occasionally the disease, which has commenced as a neuralgia or a spasm, has appeared to terminate as an inflammation. I reserve the illustrations of this position, with some others of no trifling importance, for further investigation; in the meantime I remain satisfied that I have drawn the attention of the profession to several points in the subject of cerebral disorder which are new and important in practice; to some others which are modifications of old notions; and to the whole subject of dentition, in its relations to the developments of the body, under a point of view not unimportant to the anatomical philosopher and practical physician.

THE END.



